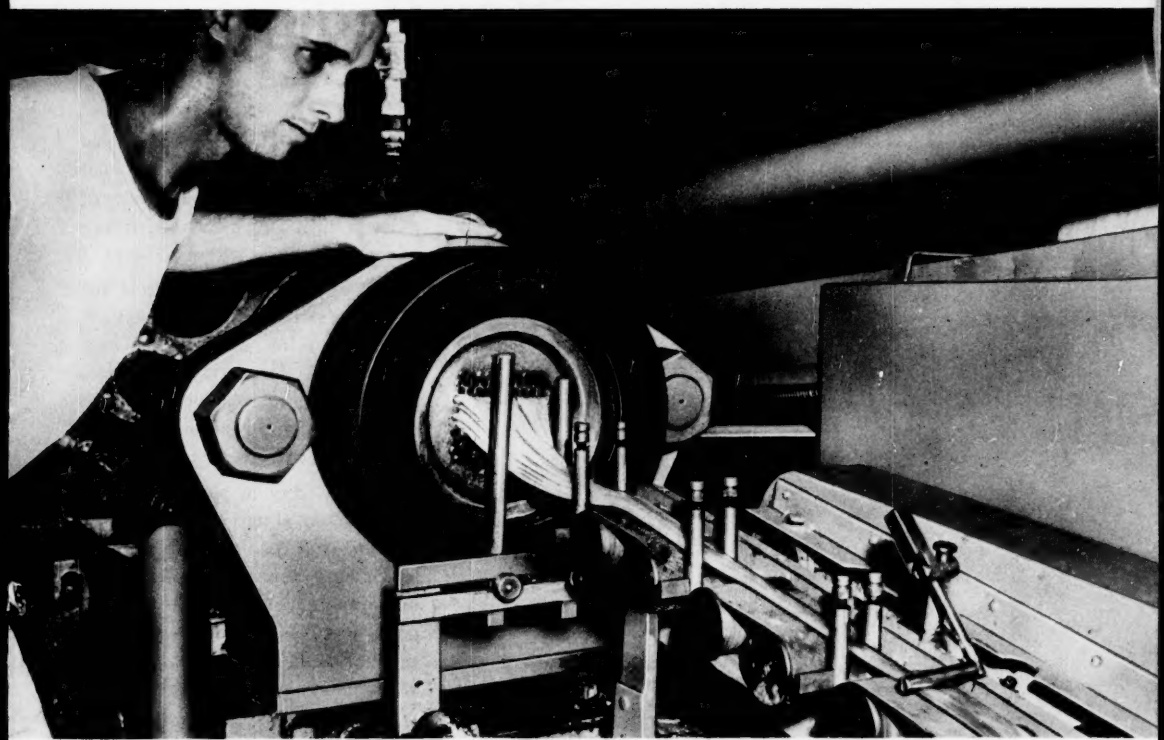
NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



One of many innovations in advanced plant of S. F. Whitman & Son is this stratified-candy extruder. (Story inside)

DECEMBER, 1949: More cost-cutting articles, Report on deaeration, Removing metals from foods, New lard process, Engineering, Annual index

THE DALMATIAN, originally bred to run with coaches and carriages, may suffer from technological unemployment today but he is still popular. He is a loyal, one-family dog.

The pure breed is white with either brown or black spots, round and varying in size. He should measure 19 to 23 inches in height.

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BORDEN'S Grated American Cheese is one of many famous national brand products shipped by truck, rail, water or air in Union corrugated containers—the boxes with a pedigree.

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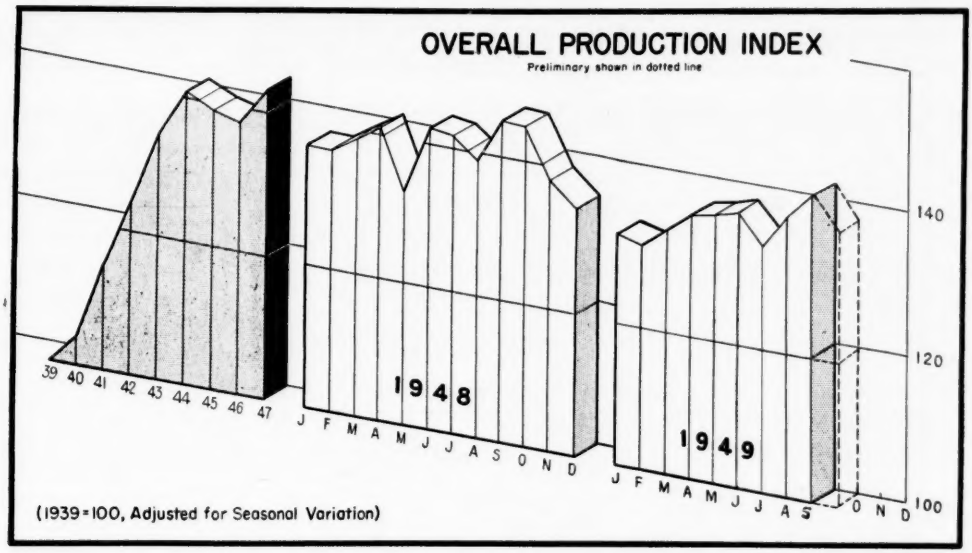
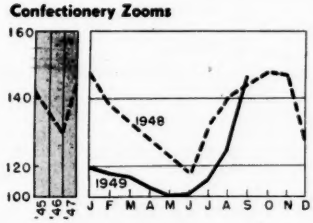
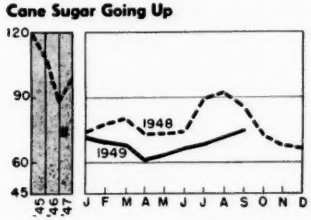

OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
140
120
100
39 40 41 42 43 44 45 46 47
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Confectionery Zooms



Cane Sugar Going Up



At a Glance—

(1939 = 100, With All Figures Adjusted for Seasonal Variations)

	September 1949	August 1949	Percent Change	Year Ago
Baking	147	144	+2	143
Beverages	169	173	—2	168
Butter	74	75	—1	57
Canning	127	130	—2	145
Cereals	163	166	—2	130
Condensed Milk	171	174	—2	172
Confectionery	147	125	+17	144
Flour	126	125	+1	130
Ice Cream	172	174	—1	174
Malt Liquors	173	176	—2	161
Margarine	300	311	—4	302
Meat Packing	149	142	+5	159
Sugar, Beet	68	65	+4	111
Sugar, Cane	75	71	+6	86

Overall Food Output Declines Despite Confection Gain

PRELIMINARY figure of 138 for October brings to a halt the rise in total food production that set in after the July low point. September final was 142.

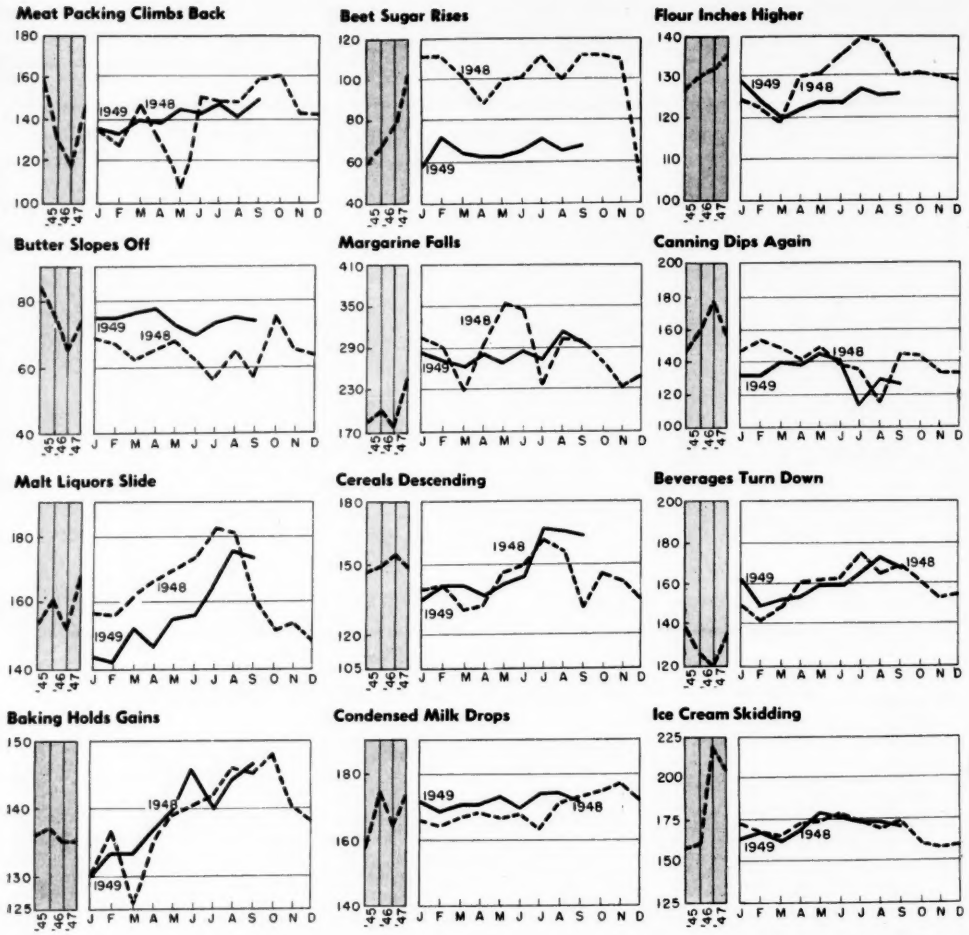
Confectionery leads the parade in the commodity indexes, showing a 17 percent rise in September. A combination of factors appears to be at work in bringing about the candy increase. Output has been exceedingly low throughout the year, and much of this increase is simply a "catching up" operation. The drop in cocoa prices and stable supplies of sugar have also contributed.

If the fourth quarter continues the improvement made in the third quarter, then 1949 will go down as another big year for the processing industry as a whole. Domestic food consumption has probably equalled or exceeded last year. The declines which have taken place in production are largely attributable to reduction in stocks, in contrast to the inventory rebuilding which went on in 1947 and 1948. There has also been some drop in food exports.

Total consumer expenditures for food seem likely to match 1948 levels in the first part of 1949. But there may be important variations in the demand for particular food products. Among the factors influencing shifts in consumer preferences are: (1) Tendency of many households to economize on food purchases after free spending in recent years, (2) falling prices for some foods, which make these foods attractive to budgeters, and (3) the search for convenience, which favors foods that are easy for housewives to prepare.

The trend toward cheaper eating has not caused any drop in total food sales because the number of consumers is still increasing through population growth. But it is an important fact for food producers to note. At the peak of the postwar boom, consumers were spending close to a third of their income-after-taxes for food. The current rate of spending is only about 27 percent of income. And the prewar average ratio was only 23 percent, indicating that some further decline may occur. Per capita consumption of food has changed little in the past three years.

Meat is one of the products favored. With prices falling, consumption has



risen from 146.4 lb. per capita in 1948 to 147 lb. in 1949. In 1950, the Department of Agriculture predicts that per capita consumption may reach 150 lb. That would be well above the prewar average of 134 lb. but below the 155 lb. recorded in 1947. Evidently, getting consumption back up to that level depends on continuing the downtrend in prices.

On the other hand, consumption of dairy products has declined recently and may dip slightly more in 1950. Prices of fluid milk, cream and ice cream have been relatively high. Butter consumption has risen after substantial price cuts, but the price of butter is still higher than in the past by comparison with margarine. Processors are somewhat restricted in any effort to reduce prices of dairy products by the fact that their raw materials costs are pegged. Milk and butterfat are already at levels where the price is being actively supported by government purchases. Moreover, the farm price support level for these products has just been raised by the new support law enacted by the last Congress.

The convenience factor works in favor of many foods, even if these foods command a premium price. Increasing consumption of frozen products, particularly frozen fruit juices, illustrates this point. Probably at some future date price reductions will be necessary to broaden the market for these items. But there is still no indication that the present market is near saturation.

Household consumption of flour products has risen, as noted in the increased sale of prepared bread and cake mixes. By eliminating much of the work of home baking, these preparations have gained widespread acceptance. But they have cut into consumption of bakery products.

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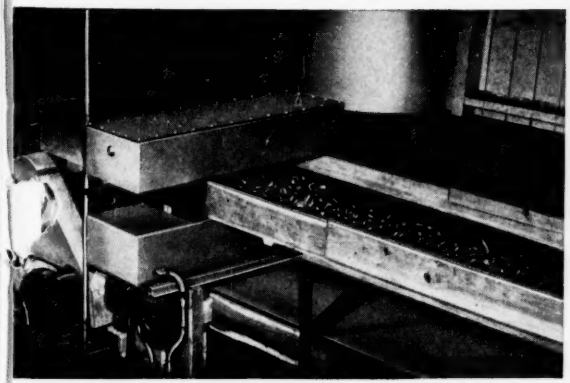
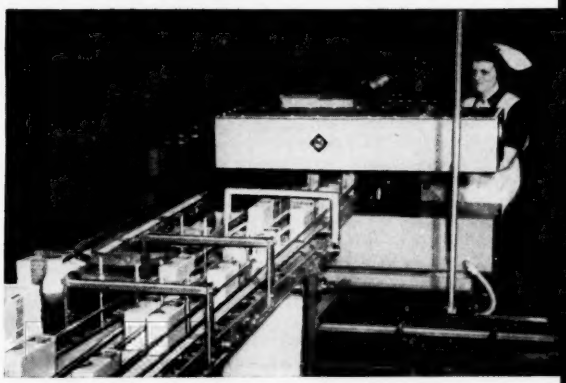
TRUE STORIES from Files of Four A-C Metal Detector Users

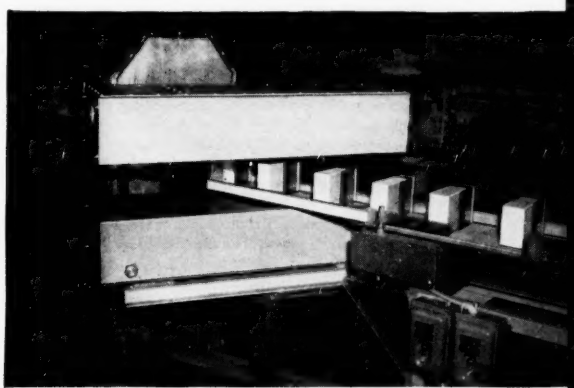


PAID FOR ITSELF — The first month the Electronic Metal Detector was installed in the plant of a cigarette manufacturer, the unit paid for itself by preventing damage to cutter knives. This is typical of prepackaging inspection of fruits, vegetables, and meats to be packed in metal or foil containers.



SAVED THE DAY — Candy maker started up his new Electronic Metal Detector and found it indicated metal in every package. He thought it must be the detector and called a serviceman. Discovered instead that rust scale from overhead pipes had contaminated the entire batch of candy during mixing. Typical candy plant installation shown.

PREVENTS CONTAMINATION — Large flour mill inspects 100-lb. bags of flour in a super sensitive 12 in. aperture type Metal Detector set vertically. Biggest trouble they found is with small pieces of metal from grain processing equipment that gets into the flour. Typical installation of Metal Detectors in vertical position shown.



DETECTS METAL SMALL AS .039 IN. — The consumer is protected by food packagers employing the Electronic Metal Detector, as shown, on packaging and canning lines. Your problem may be as unusual as the manufacturer of meat products who found stray B-B shot from hunters was a problem, and solved it with a Metal Detector.

PREVENT COSTLY SHUTDOWNS WITH ALLIS-CHALMERS ELECTRONIC METAL DETECTOR

MAGNETIC OR NON-MAGNETIC METAL PARTICLES are detected. Pieces as small as .039 inch are spotted no matter how deeply buried. Systems may be arranged so that when metal is detected: 1. conveyor is stopped, 2. automatic rejection device is actuated, or 3. an alarm signals for manual removal of contaminated article. Handles belts to 24" wide at speeds from 15 to 600 fpm. Aperture heights: 2", 4", 7", and 12".

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The Talk of the Industry

Medical Cure for World Food Shortage

In this country we usually think of good health as resulting from good eating. But the World Health Organization and the Food & Agriculture Organization of the United Nations now find it necessary to turn this concept around.

Many undeveloped areas are short of food because of the poor health of the people. So the idea is to increase food production by medical measures which will get rid of widespread diseases such as malaria. Once the people are well enough to work hard, they can grow enough food to make them still stronger.

As this double-barrelled attack gets under way, the cumulative results in economic and social progress will be felt around the world. And the ranks of the democracies will be strengthened as the weakness and unhappiness upon which Communism thrives are replaced by vitality and more pleasant living.

It will take a little time, so success depends upon the cold war's staying cold. Pick your own odds.

Cheap Pounds and Expensive Coffee

This country's coffee habit has been getting steadily more expensive as the world shortage ups price. Some foresee housewives paying as much as $1 a pound for the product. But the outlook has been altered somewhat by an unexpected development growing out of currency devaluation.

When Britain reduced the pound from $4.03 to $2.80, the price of coffee in Europe increased accordingly. As a result, Europeans are expected to cut coffee consumption to the extent that an extra 1,500,000 to 2,000,000 bags will be available for purchase in this market. Britain, for example, will drink 20 percent less coffee next year because of its new austerity program.

During the last war, a prominent Frenchman suggested that we send our prime meat to France because his countrymen enjoyed good food much more than did Americans. Following this "logic," perhaps the British won't mind if we drink their coffee.

Palletizing Improves Quality

It is well known that handling food containers on pallets usually saves a lot of man-hours. But there sometimes is a good effect on quality, too. Proof of this is a recent report from Washington State. It conclusively shows that there was only one-fifth as much bruising of apples in boxes when moved on pallets instead of separately. So quality teams with cost to encourage modern handling methods.

Labor Skims Cream Off Milk Business

Sometimes you can't win. Take, for instance, the situation of the larger fluid milk companies in New York. They recently reduced milk prices 1 to 2½c. a quart under pressure from a city investigator who unjustly charged them with monopolistic profiteering. Then the International Brotherhood of Teamsters hit the dairies for a $10 weekly wage increase, plus company-financed pension and welfare plans—to be paid for by respective levies of 10 and 5 percent on payrolls.

But the payoff came when 15 smaller dairy firms broke away from the industry's wage negotiating committee and denounced the price cuts of the big dairies as a monopolistic scheme to undermine the other dealers.

Apparently the "independents" can't pay higher wages and meet the lower prices. But neither can the large companies—and make a profit.

Another example of business being put into an impossible situation by organized labor.

Bread Should Be Kept Out of the Cold

Bread—like bananas—apparently should not be kept in the refrigerator. The bakers haven't yet written a song about it, but current research on bread staling, by the American Institute of Baking, indicates that bread deteriorates faster when cold than when at room temperature.

This has more significance than is obvious at first thought. It may mean that bread ought to be hauled in insulated trucks in winter to give maximum protection to oven freshness. AIB has been studying that, too.

Another interesting angle on bread staling is that one can refresh a loaf by squeezing it. Seems that agitation reverses retrogradation of starch molecules. Could it be that the squeezing bread is given in the store by shopping housewives is good for it?

Hors d'Oeuvres

■ As though the dairy people weren't having enough trouble, they now learn that U. of Vermont scientists prefer gum drops to cheese in mouse traps. Stuff sticks to mouse's teeth, thus diverting him while trap springs shut on his neck. For a millisecond or two, the mouse must be quite confused.

■ Succotash, peas and carrots, ham and eggs—poo! Mere cooking combinations! Out in the Pacific Northwest, they are now producing caulicab seed. Grows up to provide a thick layer of cabbage leaves with a cauliflower curled up inside. Think what a tomelon could do for the tomato juice industry.

■ "Horsehair Now Comes From Cows . . ." says a headline in the *Wall Street Journal*, ". . . With the Aid of Chemistry." Kinda suspected something, even before we read the second part.

■ "Dear Sir: I like Phillips delicious because—Phillips means food, Phillips means good food, Phillips means very good food, and the fact that they are offering four Packards to consumers for the best letters completing this sentence has nothing to do with it—much."

■ After testing 134 different kinds of eggs, Cambridge U. scientists conclude that the output of the emu is the tastiest. And just after Uncle Sam gets such a nice batch of chicken eggs stacked away.

■ Once a year, our staff points a finger at us and orders: "Say something worthwhile." But that's just because they insist on poking in here to join in wishing you and everyone a Merry Christmas.

J.A.J.J.

LINK-BELT *overhead trolley conveyors*

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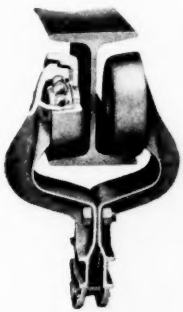
Link-Belt makes practically all types of conveyors (see below) as well as a complete line of power transmission machinery. We suggest you discuss your problem with a Link-Belt engineer, who will offer practical advice. Get in touch with the Link-Belt office nearest you.



Link-Belt overhead conveyor trolleys are the last word in rugged strength, simplicity, smooth operation. Note the construction, with drop forged steel wheels and brackets and a full complement of ball bearings operating in hardened steel races, assuring long life and trouble-free operation. Send for Folder No. 2241-B.

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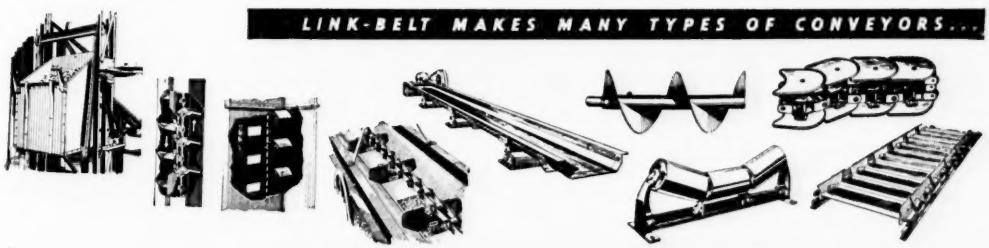

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What Washington Thinks

POTATO CHIP QUALITY — Three characteristics of potatoes have been investigated to determine their relative merit for potato chip making. A potato is best if it provides a maximum yield, a light golden brown color of chip, and a minimum of oil absorption. Recent studies in the Department of Agriculture using these criteria make it clear what varieties of potatoes the chip maker should buy for economical and quality production. Complimented are Russet Burbank, Russet Rural, and Sebago.

NONFOOD BYPRODUCTS—Surplus skim milk, buttermilk, and whey continue to be a problem of the dairy industry. Recently, government investigators have particularly emphasized new food products based on these surplus dairy items. But still more important for the benefit of the milk products business would be their increased use in non-food applications, such as casein for coated paper, glue, and water paints. Another smaller use is application of milk sugar as mold food in penicillin manufacture.

INCREASED FREIGHT—Rises in freight rates authorized by Interstate Commerce Commission during the last three years have appeared to be uniform for most classes of raw material and manufactured products. Actually, there is an important difference between some commodities and others, as well as between some areas and others.

Food executives will note with comfort the fact that food raw materials, like fruits and vegetables, have borne the smallest increases, generally between 42 and 45 percent, as compared with 1946 mid-years. The increases on animal products have been much higher —between 60 and 63 percent—though live stock bore an intermediate rate of increase, about 54 percent on the average. Finished foodstuffs like vegetable oils, sugar, packaged groceries, and similar products, are in the high freight-increase class.

It would be fine if food manufacturers could explain to all housewives how these changes in transportation cost are going to show up in market-basket prices. Perhaps a bit of publicity along that line would be worthwhile—for the contribution to the cost of living is very substantial.

ESSENCE IS TAX FREE—Congress has recently instructed the Bureau of Internal Revenue not to collect a tax of $9 per gallon on fruit essences. Formerly, this burdensome excise levy made uneconomical the use of the fruit essences in many types of fruit-flavored foods. The new act promises, Department of Agriculture executives believe, that consumers should soon be getting food products with finer fruit flavors.

DOUBLE DECLARATION—The National Conference on Weights and Measures at its last meeting in Washington again considered seriously the proposal that each package of frozen food provide a declaration of the amount of solid and the amount of frozen liquids as *separate* items. This effort of interested state and local officials is not likely to be mandatory generally; but it is quite possible that statewide requirements of this kind will be adopted. It's a matter that needs to be watched.

STANDARDIZATION — There continues to be considerable demand among local officials and by certain women's organizations for the standardization of food package sizes. The idea is that any particular commodity should always be in 2, 4, or 8 oz. packages, or in some even multiple of a pound. The present common food practice of choosing a desirable container size and then labeling the resulting content is criticized on the ground that it deceives the housewife purchaser. Recently, the idea of "package standardization" in this manner secured a strong endorsement in principle by the pertinent committee of National Conference on Weights & Measures.

WATERED STOCK—A careful investigation by the Missouri Agricultural Experiment Station convincingly shows that a cow should have a plentiful supply of cool water, especially in warm weather. One beneficial result is an increased production of milk. This method of watering the milk is legal, of course. One wonders whether the required four pounds of water per pound of milk results in any change in the water content of the lacteal fluid. Perhaps efficiency in milk production by the water route ought to be of concern to Food & Drug Administration.

MORE PROCESSING — Substantial growth in the proportion of fruit and vegetable crops that are processed is reported by recent statistical studies of Farm Credit Administration. Incidentally, cooperatives are doing an increased share of this business in most instances. Co-ops doubled their pack of frozen fruit between 1945 and 1948. They made a 12 percent gain in canning activity on fruits, but only a 4 percent gain in canned vegetables. Their citrus pack was up by 28 percent between 1947 and 1948. The only activity of co-ops that declined was frozen vegetables, which decreased by a mere 2 percent. Co-ops are thus an outstanding factor in the whole processing business.

OFFICIALS NAMED—Public Health Service has named a chief for each of those regional offices dealing with questions of stream pollution. Probably most important to food technologists is the appointment of Louis F. Warrick as engineer in Washington in charge of the extensive water-pollution control research program. Cooperation with all technical service branches, and with the research group in Washington, will be encouraged by the Service. But when local regulatory and survey questions are involved, most effective means of cooperation will probably be found in the regional offices.

It is going to be necessary for many of us in food technology to become well acquainted with BOTH Washington and regional officials.

LAW MAKING—The 1949 activities of Congress resulted in much more legislation than seemed at all probable early in the year. On adjournment, the legislators went home amid a shower of bouquets and brickbats, the character of the comment varying largely with the social sentiments of the observers. Two important generalizations seem justified: First, Congress dealt vigorously with international problems and has left all idea of isolationism in the ash can. Second, much more emphasis on Federal control of many activities has been established, or seems likely to mature next year before the present Congress ends. This latter tendency accounts for the frequent charges of a "movement toward statism."

EMULSIFIERS — In promulgating tentative standards of identity for salad dressing, F&DA finds no evidence on which to justify specific designation of those emulsifiers that are encompassed in the general descriptions of suitable optional ingredients. Is this a bread standard preview?

—R. S. McBride, Washington, D. C.

HIGHLIGHTS

Congress again indicates that any reduction in farm supports—even for surplus commodities—is a forlorn hope. Selection of a "permanent" bill seems to rest between the old 90 percent supports for "basic" products and 100 percent for most commodities. In either case, the farmer is in for a lot of political control. (See News section)

Unique non-stick property of Teflon plastic is leading to its use in food machinery, such as dough rounders. It is being considered also for confectionery equipment parts and molds. Teflon is quite strong, resists abrasion, withstands high temperatures, and is rarely affected by any chemicals. It can be molded to shape or sprayed on, and is excellent gasket material. It may be the answer to many "sticky" problems.

What to do with citrus pulp has become a problem in the skyrocketing frozen concentrated juice industry. And Minute Maid has come up with an answer. Water and citrus oils are removed from the pulp without hydrolysis of the protopectin, then the dried and ground product is used as plastic filler. The protopectin reacts in polymerization to chemically bond the filler to the resin, giving a hard, tough plastic. Again, byproduct development pays off.

Dairy prices in general will be slightly lower in 1950, according to USDA's outlook for the industry. It's a combination of a falling-off of exports and weakened domestic demand in the face of a milk supply as great or greater than this year. But processor stays in middle.

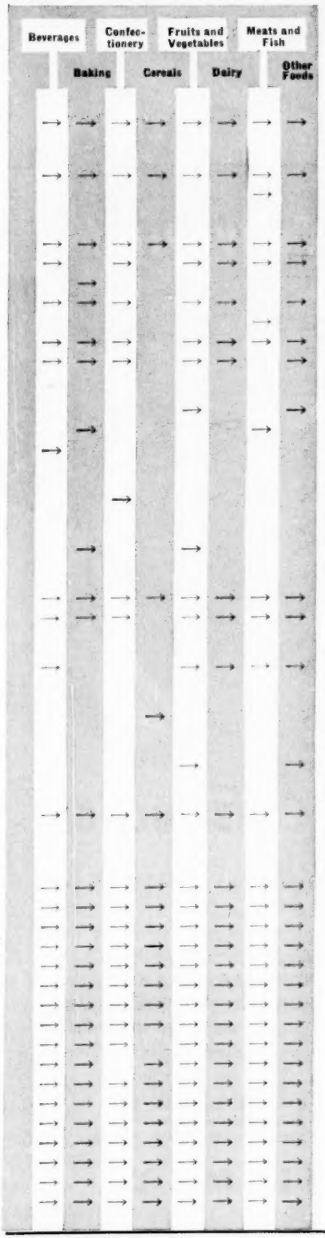
A recently developed semi-continuous method of alkali-rendering and refining of lard now bids to compete with the older steam, open kettle and vacuum-rendering processes. Lard made by the new method is termed far superior to the steam-rendered product, and it may be competitive with other shorteners. Result may be a comeback for lard as the standard domestic and commercial shortener. (See article in this issue)

Half-baked rolls are an interesting innovation in the baking industry. These are ordinary rolls baked at 275 deg. F. until the starch is set. The housewife buys the white, underdone product, puts it in the oven for 7 to 10 minutes, and gets fresh, hot, nicely browned rolls. The underbaked "makings" will keep a week at room temperature, two weeks in a refrigerator, indefinitely when frozen. The idea originated with a small Southern baker, was picked up by General Mills and introduced in Chicago early in November. Time lost: None.

Removal of the $9-per-gallon tax on production and sale of alcohol-containing essences—which include most fruit essences—is hailed by manufacturers of ice cream, sherberts, carbonated beverages, candies, table syrups and gelled desserts. A cut in taxes of any kind is really big news today. (See News section)

An ingenious filter-paper technic for separating constituents of a complex substance, such as proteins, has just been introduced to cereal chemists in New York. Called chromatography, it involves placing a drop of the substance to be analyzed on the edge of filter paper. Constituents—such as amino acids—are absorbed on the paper at different points. Turning paper at right angles gives further separation in a 90-deg. direction. Spraying with a chemical colors the spots. Or ultraviolet can be used to make spots fluoresce. Area and density of spots are measured. Accuracy as high as 2 percent is reported possible. Method is said to be better than microbiological analysis for some work and to have wide food use.

INDUSTRY INDEX



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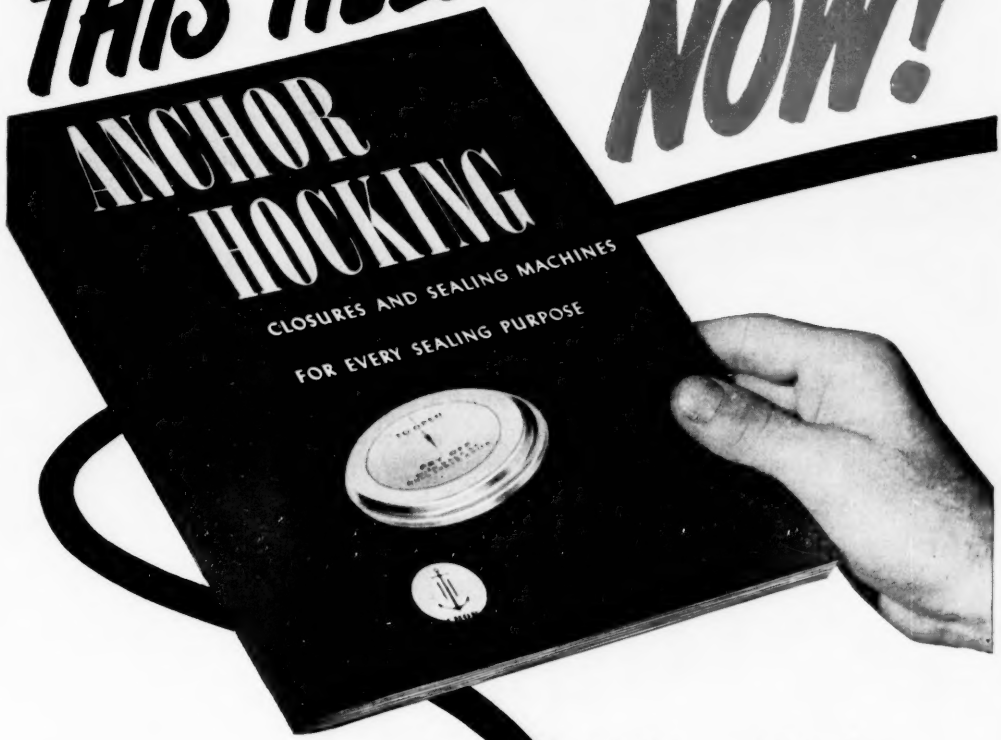

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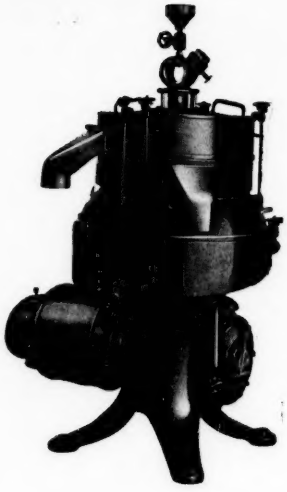

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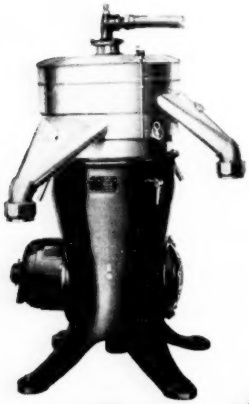

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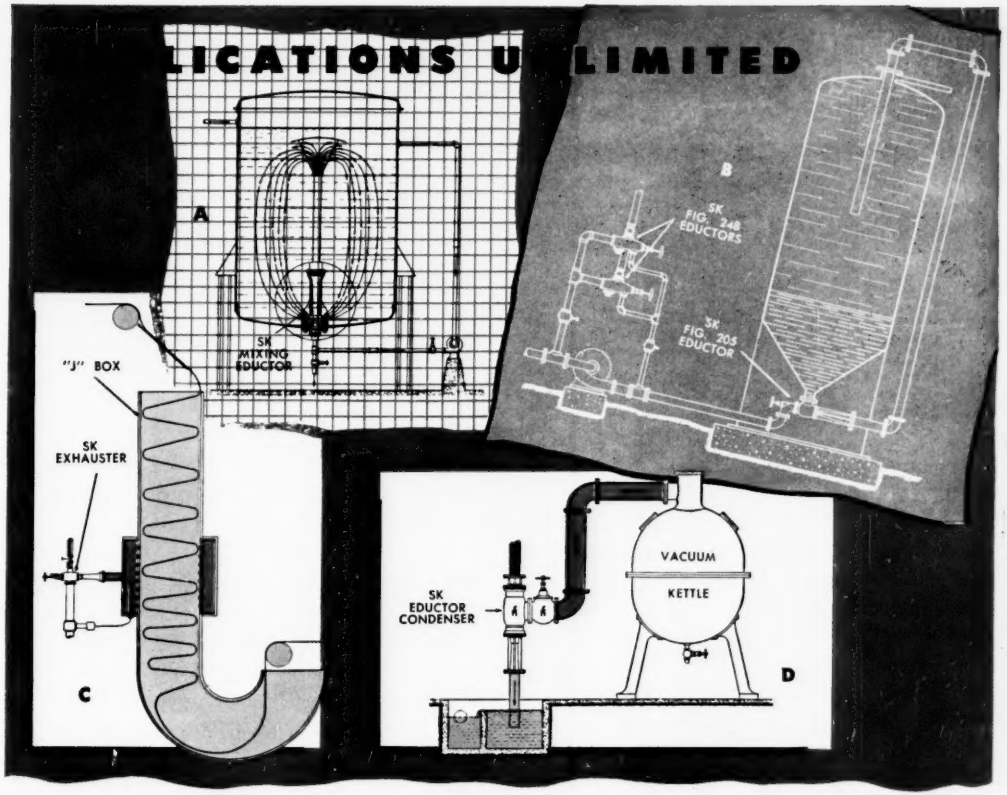

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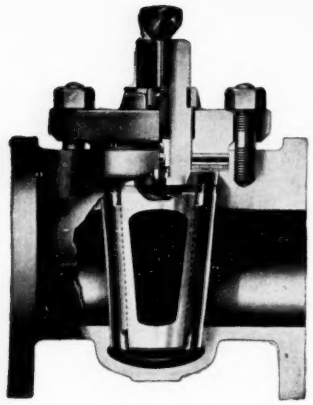

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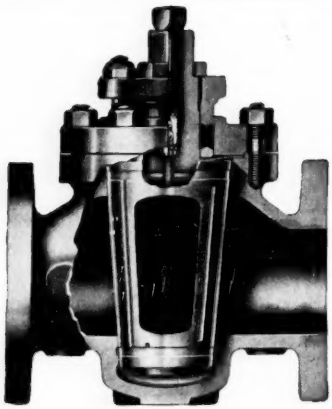
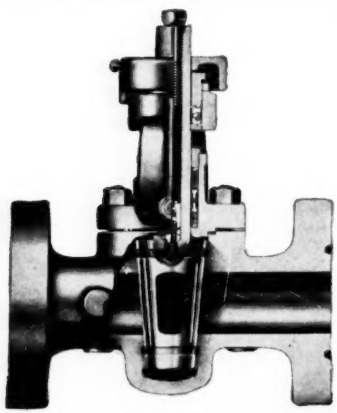


Regular Gland Type



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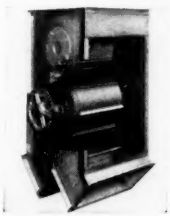

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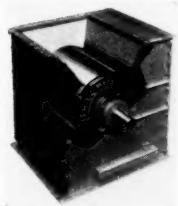
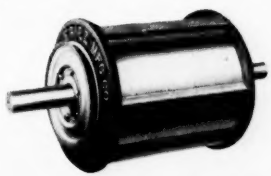


DF-102—Compact cubicle housing for minimum space requirements. Self-cleaning and dust tight.



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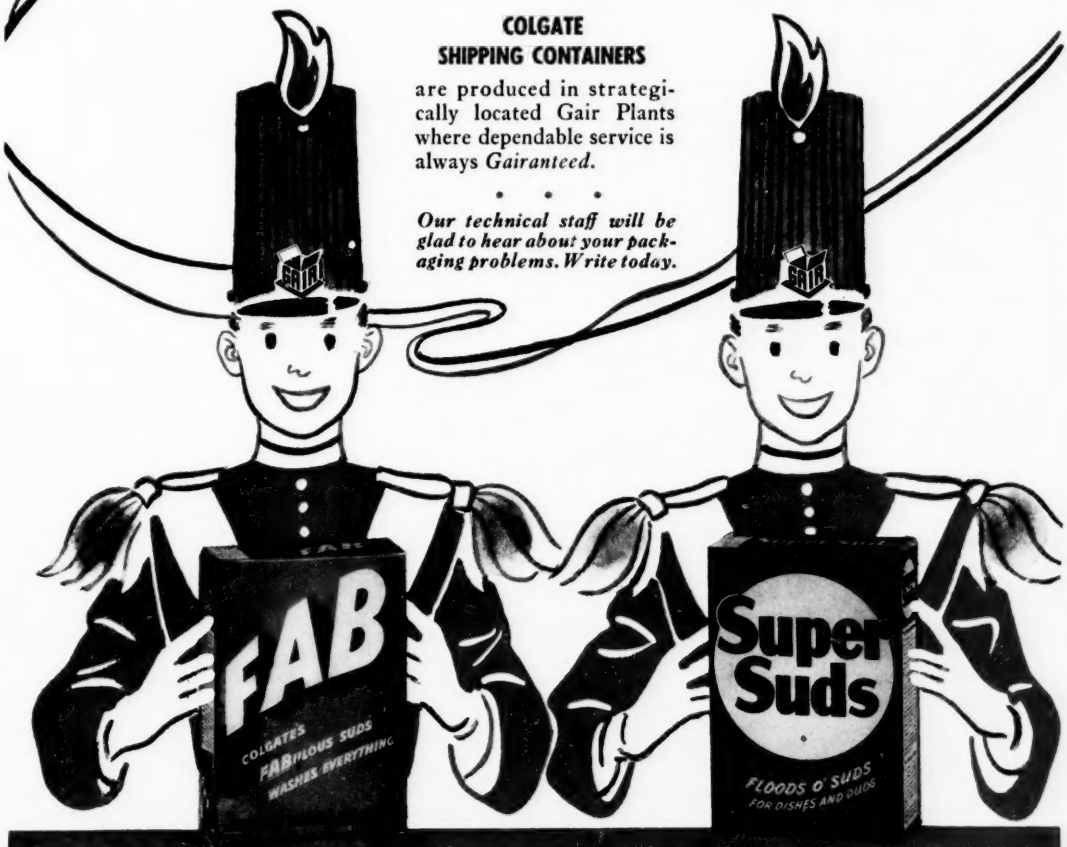

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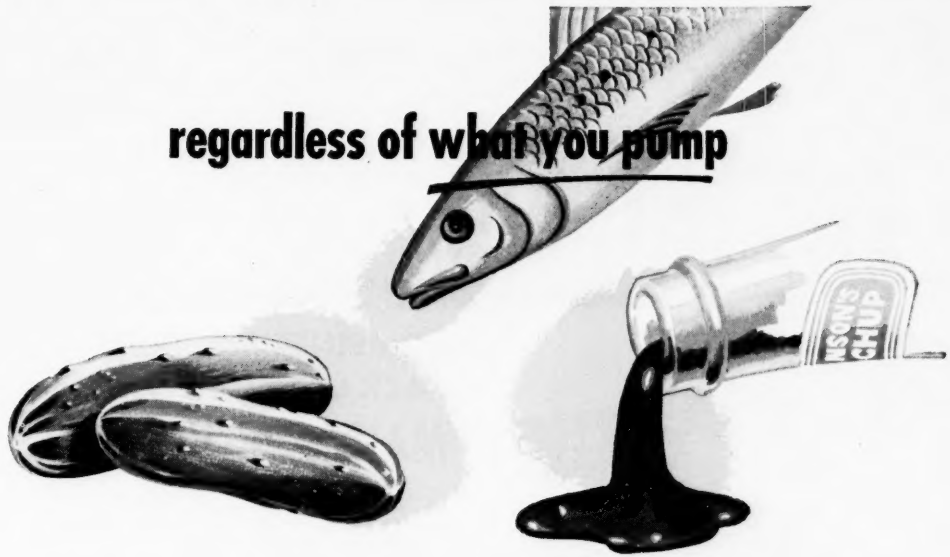

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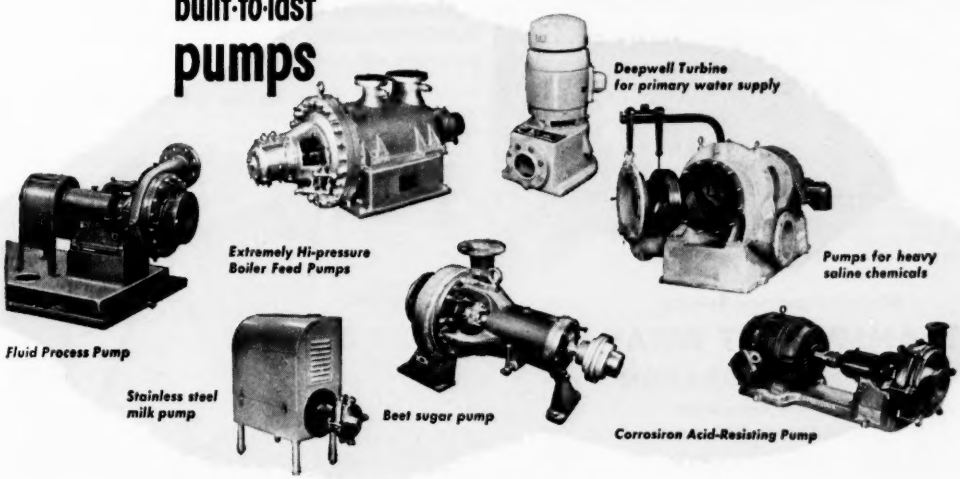
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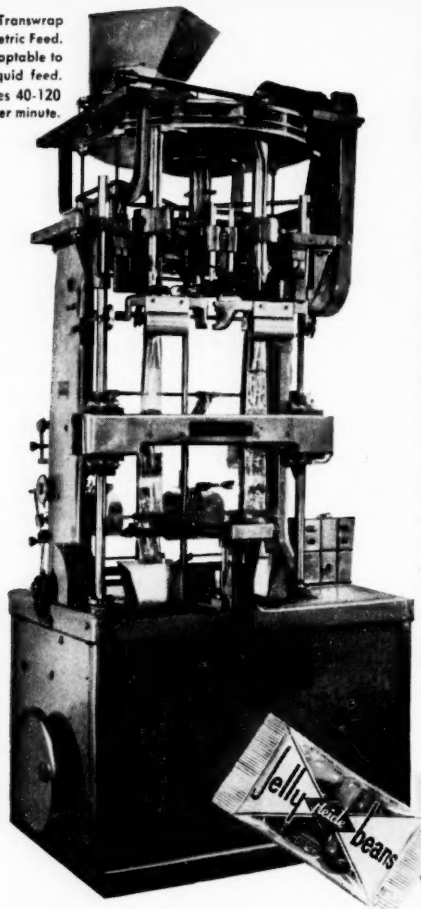

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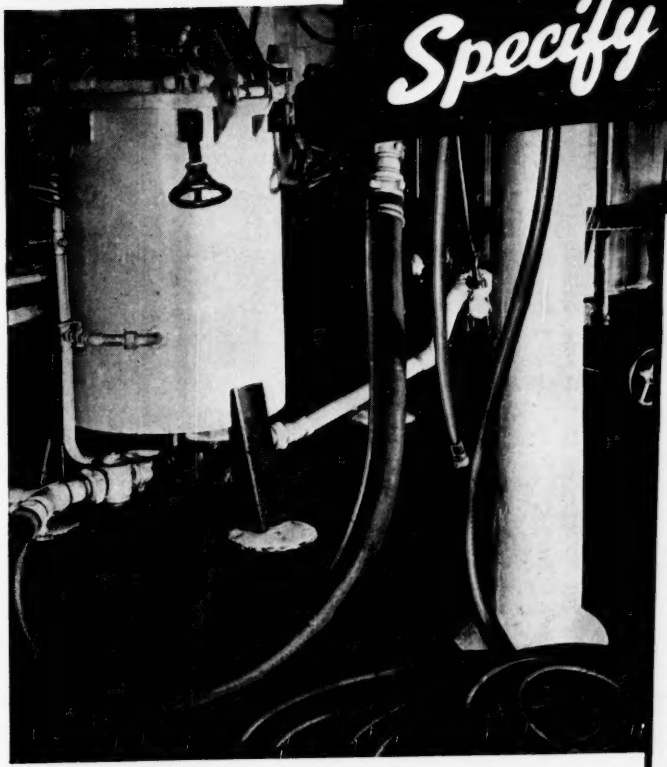

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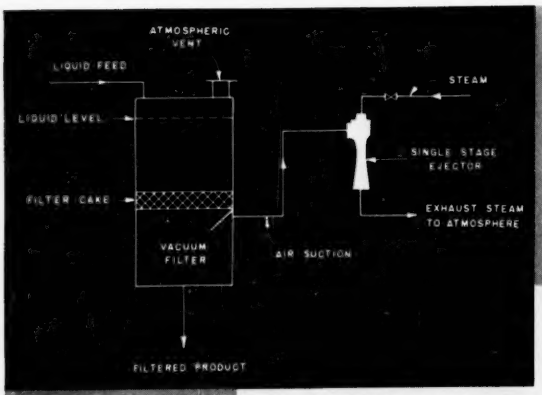
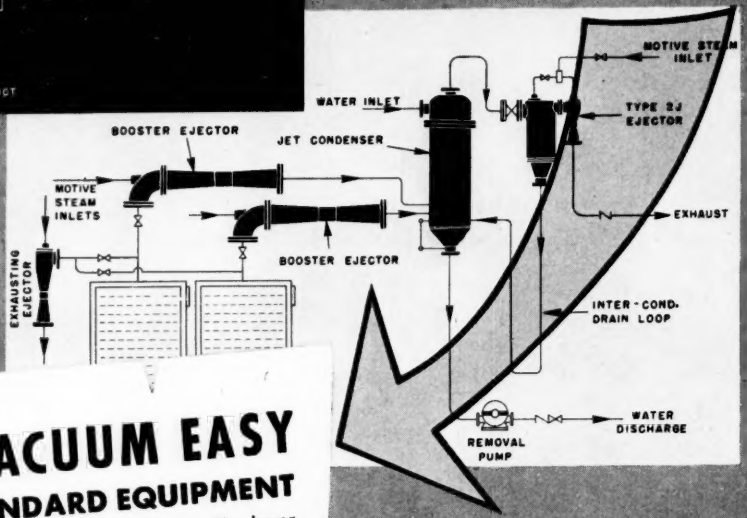


SIMPLE? YES

COMPLEX? NO



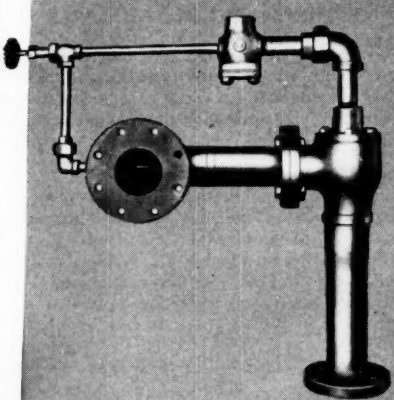
ANY VACUUM EASY

WITH STANDARD EQUIPMENT

Compare the two diagrams shown above. The lower one appears to be quite complex, but actually it isn't complicated at all. It is nothing more than two Booster Ejectors in parallel hookup exhausting to a direct contact Jet Condenser, and a two-stage exhausting Tubejet with Inter-Condenser, for rapid initial evacuation. What's more, all equipment is standard, thus effecting considerable savings in initial cost. C. H. W. experience in engineering high or low vacuum requirements for all types of applications, plus a complete range of sizes of standard units, assures easy and economical solution of all your vacuum problems. Catalog 1462 describes a complete range of standard sizes from single stage units for maintaining pressures down to 3.5 inch mercury, and multiple stages up to five for maintaining absolute pressures below 250 microns. Write for it today.

C. H. WHEELER MANUFACTURING CO.
1828 Sedgley Ave., Philadelphia 32, Pa.
REPRESENTATIVES IN MOST PRINCIPAL CITIES

SINCE 1903



C.H. Wheeler OF PHILADELPHIA

STEAM CONDENSERS • WATER COOLING TOWERS
EJECTORS • STEAM JET VACUUM REFRIGERATION

VODOL-XX is the exclusive product of Refining Unincorporated

GOLDEN BROWN
Naturally
Free-flowing!

VODOL-XX

Famed throughout the industries as the

CORN-OIL LECITHIN

(BONE-DRY)

IN THEIR OWN PRODUCTS—in continuous use of VODOL-XX over long periods—representative food industries have proved its unequalled advantages to their complete satisfaction. Pure virgin corn oil provides nature's finest lecithin! Processing by Refining Unincorporated has brought its incomparable qualities to perfection.

THE BONE-DRY CHARACTERISTIC OF VODOL-XX positively prevents any moisture disturbance. (Important to the chocolate manufacturer.)

Free-flowing VODOL-XX also means

- No pre-heating, pre-dissolving, straining nor thinning
- Instant solubility at low temperatures
- Ready dispersion in fats
- Freedom from lecithin taste and odor in end product
- Longer shelf-life and freshness

Join the others who have found VODOL-XX the most satisfactory on all counts in

Packing Industries • Baking • Confections • Drugs and Cosmetics
All processing using Lecithin

FREE!
VODOL-XX for plant test

Judge VODOL-XX in your own plant—at our expense. *Mail Coupon Today!*

FI-1249

Refining Unincorporated
407 S. Dearborn St., Chicago 5, Illinois

Without obligation, I'll be glad to give VODOL-XX a trial in our plant.

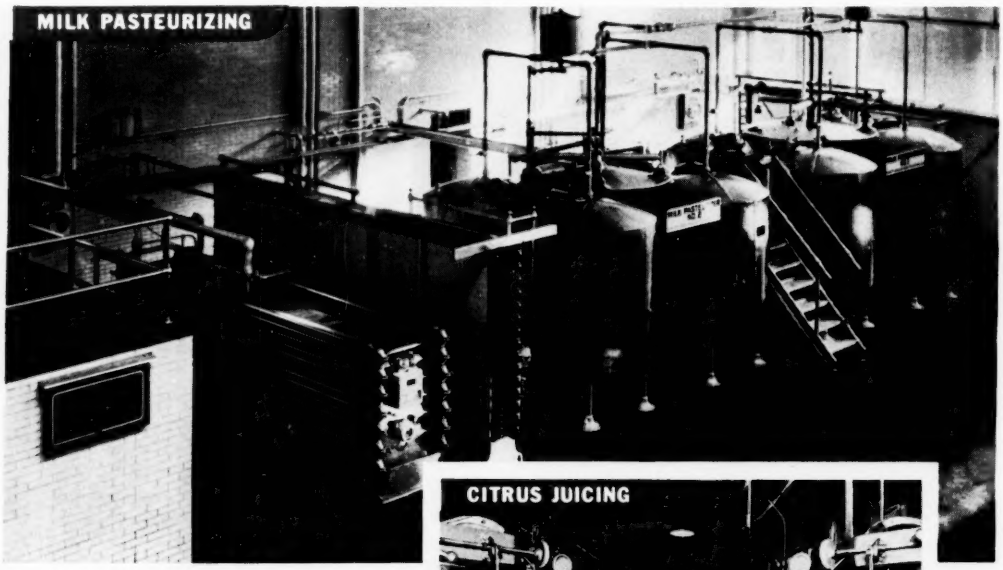
Name _____

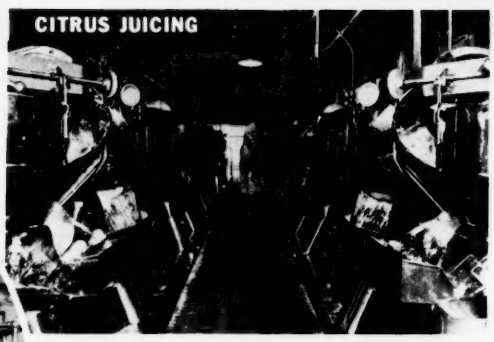
Position in firm _____

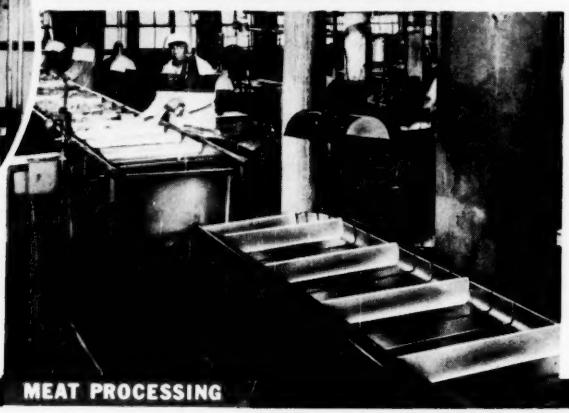
Firm Name _____

Address _____

Always remember... *First cost*







is last cost

with Stainless Steel equipment

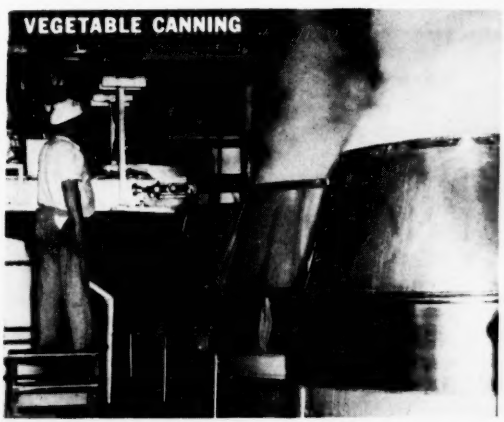
TODAY, with the cost of labor and raw materials at an all-time high, it would seem to be out of line to suggest the purchase of equipment that costs more. But it's actually good economics. Because, when you install equipment made of Stainless Steel, you're taking the first step to lower processing costs.

The reason for this is simple. From the day it is installed, your Stainless equipment begins saving you money at a rate that soon offsets any slight additional premium you may have paid for it—and it is cheapest to use from there on.

Stainless Steel's ability to pay extra dividends is the result of its exceptional resistance to the corrosive action of fruit, vegetable and organic acids, *plus* its excellent ability to withstand wear. Together, these characteristics practically eliminate the problems and costs of maintenance. In addition, the ease with which Stainless can be cleaned and kept clean effects important and continuous savings in labor.

For multi-product processing, Stainless equipment has special advantages. It is easily adaptable to all types of material . . . it won't affect the purity, color, flavor or vitamin values of *any* product you happen to be handling. And where appearance is important, Stainless is unsurpassed for its *lasting* good looks.

All these benefits add up. That's why, no matter what food products you are processing, it will cost you less in the long run to use Stainless Steel equipment.



HOW TO OBTAIN THE BEST PERFORMANCE FROM STAINLESS STEEL

United States Steel's manufacturing subsidiaries maintain a staff of chemists, engineers and metallurgists to help the food industry solve its processing equipment problems. They'll advise you on the best type of Stainless Steel for any particular application; how to fabricate and use the material to best advantage; how to adapt equipment and materials to the continuously changing requirements of multi-product processing.

This skilled technical assistance is only one of the advantages you obtain when you specify U·S·S Stainless Steel. In U·S·S Stainless you get a perfected, service-tested material, uniform in finish and in fabricating quality. It permits the widest latitude in design and the employment of the most modern techniques in manufacturing. For the finest performance from Stainless Steel equipment, be sure it's "U·S·S Stainless."

SEND FOR THIS BOOKLET—If you use or fabricate food handling machinery, you'll be interested in our booklet, "Fabrication of U·S·S Stainless Steels." For your copy, write to United States Steel Subsidiaries, 2122 Carnegie Building, Pittsburgh 30, Pennsylvania.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
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USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-1891

UNITED STATES STEEL

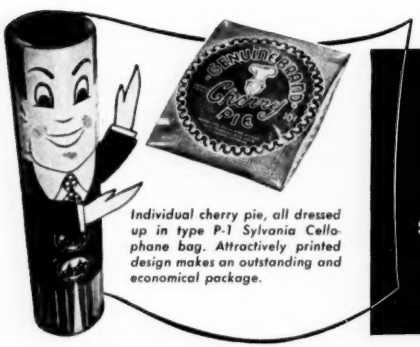
CELLOPHANE gives you all this in one package

Name your packaging requirements! Whatever your product calls for, there is a Sylvania Cellophane to give it the utmost in protection and gleaming beauty that means sales.

Take Sylvania Cellophane, types MS, DS or P-1, for example. These protective films were engineered with your needs in mind. They are truly transparent . . . offer extra visibility. They resist grease . . . keep your products free from contamination. Their uniform strength makes them easy to apply either by hand or automatic equipment. In addition, types MS and DS offer the heat sealing qualities and the moisture protection necessary for most applications.

Talk over your packaging problems with the Sylvania representative. He'll be glad to help you determine the combination of properties needed for your products. Or write to Market Development, Dept. F-12, for information, mentioning the specific application in which you are interested.

You will find us most cooperative.



Individual cherry pie, all dressed up in type P-1 Sylvania Cellophane bag. Attractively printed design makes an outstanding and economical package.

SYLVANIA CELLOPHANE ®

SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 350 Fifth Avenue, New York 1, N. Y.

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THE BEST LIFT TRUCK FOR INSIDE WORK

MOVE MORE MATERIALS

Inside your plant with a HYSTER® LIFT TRUCK

The complete Hyster line of trucks—7 models (2,000 lb. to 30,000 lb. capacity) are gasoline powered; all are equipped with pneumatic tires. Illustrated at top of page is Hyster 20; above, Hyster 40.

Saves Floors...Cuts Maintenance Costs. More Speed, More Traction, More Maneuverability.

The Hyster Pneumatic Tire "Easy Ride" is easy on floors—easy on the load—engineered for greater maneuverability in narrow aisles and crowded warehouse spaces. HYSTER IS THE IDEAL LIFT TRUCK FOR INSIDE WORK.

Big PNEUMATIC TIRES CUT DOWN FLOOR SURFACE REPAIRS, practically eliminate damage to costly floors. TRACTION and RAMP CLIMBING ability is increased. Operator fatigue is reduced.

Your Hyster Distributor will demonstrate a Hyster 20 (2,000 lb. capacity) or a Hyster 40 (4,000 lb. capacity) for your *inside and outside* materials handling jobs. You can check your own savings. SEE FOR YOURSELF or write for literature.

HYSTER COMPANY

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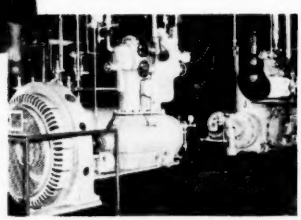
1802-35 NORTH ADAMS STREET.....PEORIA 1, ILLINOIS
1010-35 MEYERS STREET.....DANVILLE, ILLINOIS

HYSTER

in frozen-juice processing, too, G-E drives help

Direct-mounted on a refrigerator compressor at Vacuum Foods is a 100-hp G-E synchronous motor for maintaining exact speeds and correcting power factor. Its control panel (above) is typical of many G-E controls in the plant that help keep operations flowing smoothly.



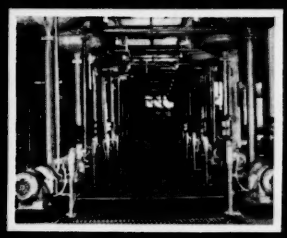
For reliable performance and close quality control, G-E equipment is used practically throughout at Vacuum Foods

Here's an example of a food plant that decided to "go continuous" right from the start. It's the Vacuum Foods Corporation plant at Plymouth, Florida, processing Minute Maid frozen orange-juice concentrate. As many others have done, it turned to General Electric to supply and co-ordinate practically all its electric equipment. Now this plant, too, knows how G-E motors and control can help keep a processing line running at top capacity, contribute to uniform product quality.

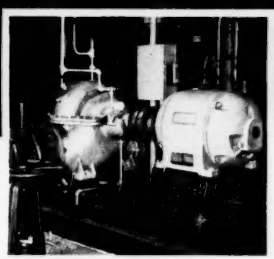
If *you* are planning on "going continuous" to reduce handling costs in your food plant operations, it will pay you to check first with a G-E sales engineer. Backed by a staff of engineers specializing in the food industries, he can help you obtain the many advantages of continuous processing methods at lowest cost—by efficient application of G-E motors and control. Call him at your nearest G-E office. *Apparatus Dept., General Electric Company.*

Food Plant Drives

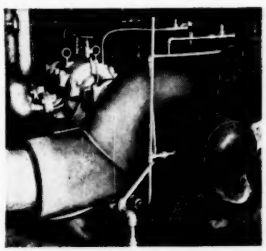
GENERAL ELECTRIC



Pumps shown here that circulate juice at high speed through a vacuum evaporation system are driven by a group of 2-hp G-E totally enclosed fan-cooled motors. In cast-iron construction that resists corrosion, and protected against dripping or splashing liquids, these sturdy motors require only a minimum of maintenance.



With 3500 gallons of water per minute needed, pump motors must be especially dependable. This 75-hp G-E Tri-Clad open (dripproof) motor, one of many throughout the Vacuum Foods plant, provides a high degree of service continuity in driving pumps for the water circulating system.



Here, a 40-hp G-E mechanical drive turbine drives one of the plant's boiler feedwater pumps. For food plants using process steam, G-E turbines provide a reliable, low-cost machine drive while also acting as a reducing valve to furnish low-pressure process steam.

G-E Battery Chargers for electric trucks

KEEP EM ROLLING

At the Vacuum Foods Corporation plant in Plymouth, Florida, frozen orange-juice concentrate is moved quickly and continuously by means of electric battery trucks. To help insure the uninterrupted service needed for top-capacity production, the plant makes extensive use of its G-E copper-oxide battery-charging equipment. Among its many advantages that have "sold" Vacuum Foods are these:

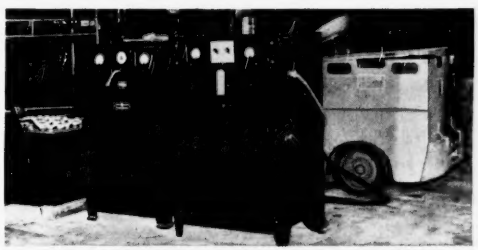
Fully automatic. After operator sets a control, the charger takes over, delivers the charge, and then shuts itself off.

Easy to use. Operator just plugs in the cable leads, and the charger does the rest. No special equipment is needed for installation.

On-the-spot charging. Units can be easily moved, or placed strategically to be ready and handy when needed. No time or manpower is wasted running trucks to and from a central charging station.

Long life. The G-E copper-oxide stacks—heart of the charger—have exceedingly long and dependable service life. Nothing moves except a fan, so there's little to wear out and be replaced.

General Electric's complete line of battery-charging equipment, including motor-generator types, is available through your truck dealer or distributor. Bulletin GEA-5249 gives complete information.



The low cost of G-E copper-oxide battery chargers, like these two at Vacuum Foods, is quickly amortized by savings in time, faster movement of materials, and more efficient use of manpower.

See "Materials Handling"! How electric trucks and other modern materials handling equipment boost productivity is shown in this G-E sound and color motion picture. Your nearest G-E office will gladly arrange for a showing.

More Power to America

WANT MORE DATA?

General Electric Company, Section B 652-2
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

☐ GEA-3580—Tri-Clad induction motors
☐ GEA-4322—Electric equipment for the food industry
☐ GEA-5249—Copper-oxide battery chargers

Name.....

Company.....

Street.....

City..... State.....

WHAT FOOD-PROCESSING JOB WOULD YOU LIKE TO DO *FASTER-BETTER-* AT LESS COST?

Whatever it is, chances are that Rohm & Haas Commercial Enzymes can help you. For more than 40 years these versatile biocatalysts have been production expediters, quality and yield improvers, and cost cutters in scores of natural product processes.

For example:—Fruit Juices and Concentrates, Wines, Jellies and Low Solids Gels, Baking, Brewing, Distilling, Ice Cream, Whey, Cheese, Meat, Protein Hydrolysates

Enzymes Make It Easy to...

Solubilize Starches *or convert them to sugar in peas, corn, wheat and other grains.*

Modify proteins—*or hydrolyze them—in meat, animal guts, casein, lactalbumin or legumes.*

Hydrolize pectins *in fruits, fruit juices or concentrates, and wines.*

Enzymes are short-cuts to better processing. No one knows their *full* potentialities, but our 40 years experience and research have taught us much that we shall be glad to pass on to you. Write today for your test sample of Rohm & Haas Commercial Enzymes. Test them in your processing. Then make a note to discuss your specific problem with our technically trained representative—or, if you wish, phone or write us direct. No obligation, of course.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

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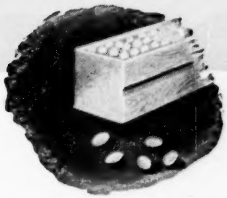
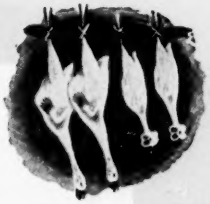
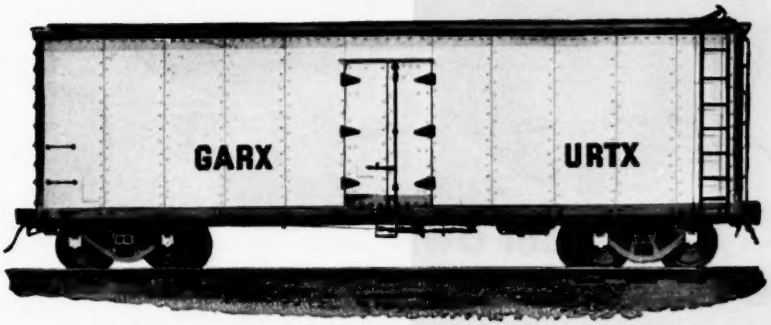
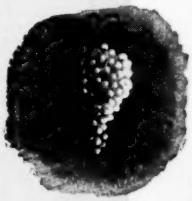




Along with many other specialized types of General American cars, this refrigerator car serves the nation's shippers.



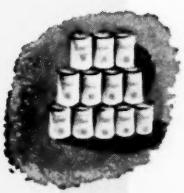


GENERAL AMERICAN

Whether you ship fruits or vegetables, meats or liquids, there is a General American Refrigerator car equipped to handle your products.

To serve you further, General American representatives located in most major producing areas are ready to help you solve your own individual shipping problems quickly and economically.

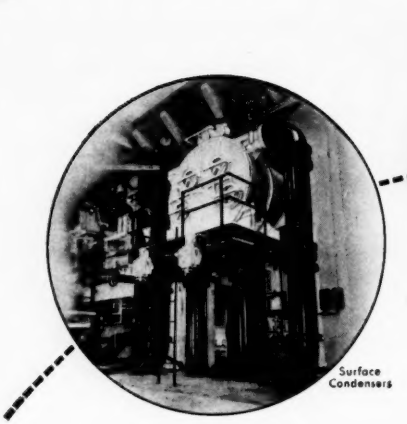
So whatever and wherever you ship, you may take advantage of General American's 50 years of experience serving the nation's shippers. And you may rely absolutely on General American's outstanding reputation for complete dependability.



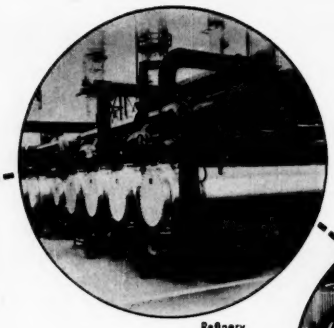
builds and operates specialized refrigerator cars for shipments of all kinds of perishables

UNION REFRIGERATOR TRANSIT LINES, MILWAUKEE

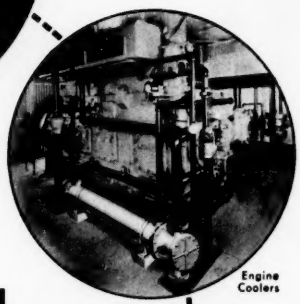
A Division of General American Transportation Corporation, Chicago 90



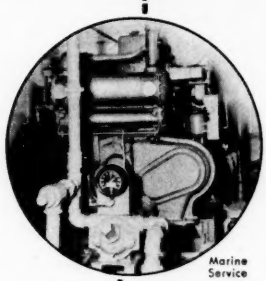
Surface Condensers



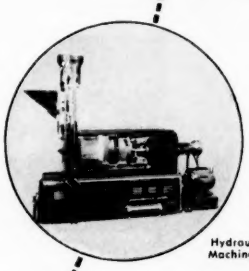
Refinery Exchangers



Engine Coolers



Marine Service



Hydraulic Machinery

For Your Own Use, Or On The Machines You Make To Sell

YOU'LL GET JOB-MATCHED PERFORMANCE FROM THESE STANDARDIZED EXCHANGERS

For a big 27,000 sq. ft. surface condenser down to a little 2-inch oil cooler, Ross standardization today means new highs in job-matched performance and new lows in unit costs.

You may be outfitting a power plant, a petroleum refinery or a chemical plant requiring large capacity heat exchanger equipment . . . or you may be selecting smaller exchangers as accessories for the Diesels, compressors or hydraulic equipment which you use or make for sale to others. Neither the size, nor the type of service, nor the operating conditions present a challenge to Ross standardization . . . for Ross has standardized *successfully* on practically everything that is required in heat exchanger equipment.

This means, naturally, that the time-robbing, cost-mounting aspects of custom fabrication are avoided wherever Ross standardization suffices . . . and it more than suffices in most instances. But, where it doesn't, you still have available the industry-leading experience in special engineering and custom fabrication for which Ross has been known some 30-odd years.

ROSS

EXCHANGERS... *MAKE OTHER PRODUCTS BETTER*

★ **PREVIEW ROSS STANDARDIZATION** by requesting free Bulletin 4300, then review it with a Ross engineer who will gladly consult. ROSS HEATER & MFG. CO., INC., Division of American Radiator & Standard Sanitary Corp., 1443 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

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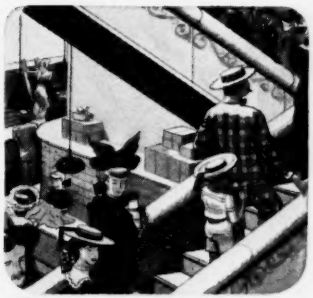
AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

1 **1800**—For centuries, steps were man's main means of going up. First came the ladder; later, crude steps formed stairways. Even so, man still had to ascend a step at a time under his own power.

2 **1875**—Stairways took all forms—straight, spiral, plain and ornate. Then, one Samuel Gray patented an "elevator and moving stairway." Though impractical, his idea set others to work.



3 **1901**—The forerunner of today's moving stairs was installed in a New York store. By 1915, Howell "Red Band" Electric Motors arrived. Soon, these rugged motors were widely applied.

SAVED...20 MILLION STEPS A DAY!

4 **Today**—Modern, electrically driven moving stairs like this handle up to 8000 persons an hour . . . and save 20 million steps a day!

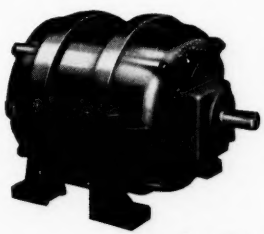
Howell is proud to have supplied the motors for many of today's outstanding moving stair applications. You'll also find Howell Motors on elevators, cranes, hoists, conveyors, fans, pumps and other important industrial equipment.

Howell's firsthand experience in the design, manufacture, and application of precision-built, industrial type motors can prove invaluable to you.

Consult Howell before you buy your next electric motor.

EQUIPMENT COURTESY HAUGHTON ELEVATOR CO.

Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.



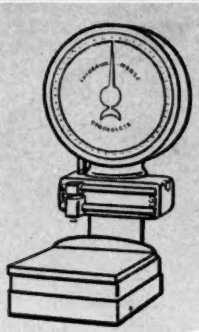
Elevator Type Motor

HOWELL MOTORS

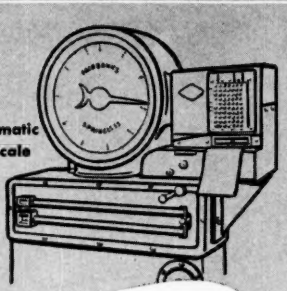
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built Industrial Motors Since 1915

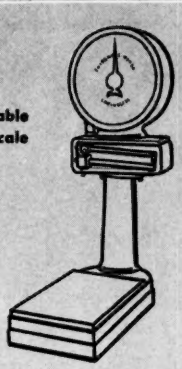
HOWELL Red Band MOTORS



Bench Scale



Printomatic Dial Scale

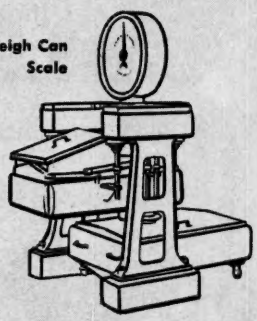


Portable Dial Scale

The easy WAY to WEIGH
FAIRBANKS-MORSE Scales

Fast, accurate, easy-to-read, easy-to-handle Fairbanks-Morse Scales offer the easy way to "weigh." Because these lastingly accurate weighing instruments are designed for fast, dependable operation . . . for maximum ease of reading, they speed weighing operations . . . minimize the chance of costly human error.

There is a Fairbanks-Morse Scale for every weighing operation. Your Fairbanks-Morse weighing expert will be glad to assist you in selecting the right style and size for your operations. Fairbanks, Morse & Co., Chicago 5, Ill.

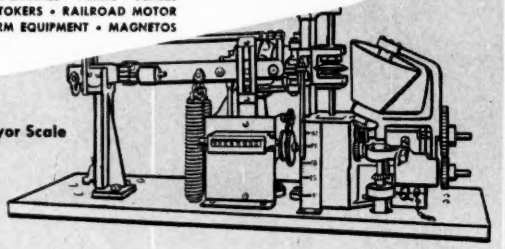


Weigh Can Scale

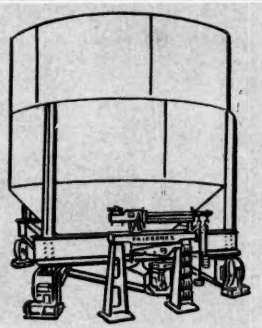
FAIRBANKS-MORSE

A name worth remembering

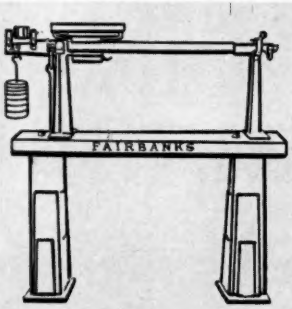
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES
MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR
CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS



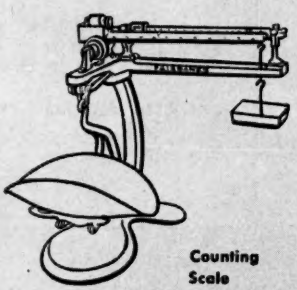
Belt Conveyor Scale



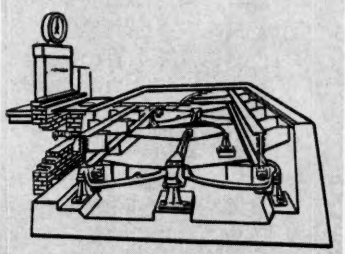
Hopper Scale



Full Capacity Beam



Counting Scale



Truck Scale

they'll keep better...with

MONSANTO

SODIUM BENZOATE

If you make fruit juice, preserves, pickles, margarine, beverages or other food products subject to spoilage, you can insure storage and shelf-keeping qualities by using Monsanto Sodium benzoate. Sodium benzoate is a preservative for food products that is permitted by federal law.

Monsanto's sodium benzoate is *pure*. It does not change the taste of your products nor reduce their nutritional values. It is absolutely harmless to human beings in amounts customarily required for food preservation.

Sodium benzoate has been the standard preservative in the food industry for three decades. It is available from Monsanto in either powder or flakes. Many food processors prefer flakes because they are dustless . . . because they dissolve more rapidly.

If preserving is a problem in your plant, write for a copy of "Preserving With Monsanto Sodium Benzoate." It is filled with useful information and suggestions. For your copy, mail the coupon, contact the nearest Monsanto Sales Office or write: MONSANTO CHEMICAL COMPANY, Desk M, Organic Chemicals Division, 1737 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Desk M, Organic Chemicals Division
1737 South Second Street, St. Louis 4, Missouri

Please send: _____Folder, "Preserving With Monsanto Sodium Benzoate"; _____Sample and quotations on sodium benzoate flakes and powder.

*Name*_____ *Title*_____

*Company*_____

*Street*_____

*City*_____ *Zone*_____ *State*_____

SERVING INDUSTRY . . . WHICH SERVES MANKIND

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

REFRIGERATION REPORT

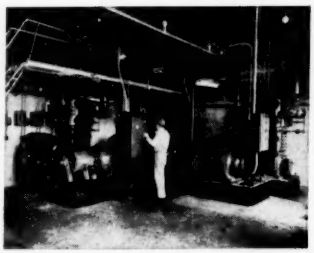
Specialists in air conditioning and refrigeration for more than 50 years

Putting A Quick Freeze On Perishables

In 16 minutes flat, Worthington compressors freeze peas, corn, strawberries, cauliflower and boysenberries at Kelley, Farquhar & Company in Salem, Oregon.

To provide the extreme cold for the quick-freezing and low-temperature air (minus 6° F) for a 100' x 120' x 14' storage room are five Worthington compressors—three 8½ x 8 vertical duplex ammonia compressors and two 17 x 11 horizontal single-stage ammonia booster compressors.

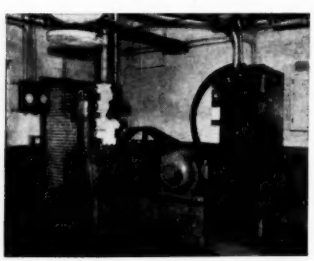
Kelley, Farquhar & Co. have recently installed an additional 7 x 7 vertical ammonia compressor to hold the storage temperature during the winter months. This compressor was added so that it would not be necessary to use a large compressor during these months, thus realizing a substantial saving in operating cost.



Three Worthington 8¼ x 8 vertical ammonia compressors at Kelley, Farquhar & Co., Salem, Oregon

How They Keep Fish Fit In Atlanta, Georgia

When, for the fifth time in 21 years, increased volume of business made it necessary for the Capitol Fish Company of Atlanta to go into new quarters, the management took advantage of the opportunity to install the most modern machinery for freezing and storing fish and other quick-frozen commodities under closely controlled temperature conditions.



Worthington 8" x 8" Ammonia Compressor for zero temperature storage rooms

For the refrigeration compressors, Worthington equipment was selected by the consulting engineer, C. T. Baker of Atlanta.

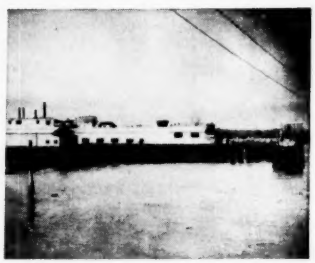
The freezing takes place in a room containing approximately 430 square feet and having a freezing capacity of 15 tons a day. Temperature is maintained at minus 28 to 30° F by means of a Worthington 4¾" x 3⅜" 6-cylinder ammonia booster compressor, operated at 720 rpm and rated at 12½ tons refrigeration at minus 41° F suction temperature.

Zero temperature storage rooms are served by two Worthington 8" x 8" single-acting vertical ammonia compressors, rated at 26.6 tons each and operating at 5 psi suction, 185 psi discharge pressure. They are driven by electric motor through V-belts. Starting and stopping are controlled by thermostat, providing a narrow pre-determined temperature range.

The high temperature storage rooms and the vestibule connecting the rooms are cooled by a 4" x 4" twin-cylinder Worthington Ammonia Compressor operating at 400 rpm.

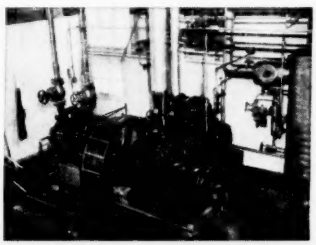
Two Good Catches Bring Cheers

The good "catch" Del Mar Canning Co. made in selecting Worthington refrigeration equipment for its new fish packing plant at Warrenton, Oregon, evidently is as pleasing to company executives as its catch of tuna, salmon, sardines and crabs.



Del Mar Canning Co., Warrenton, Oregon

"These machines have given excellent service," reports one Del Mar executive, referring to the three Worthington refrigeration compressors used for freezing whole fish and fillets, and for making ice. The Worthington equipment includes one 10 x 10 and one 7 x 7 vertical ammonia compressor and 1 ammonia booster compressor. This plant has a storage capacity of 800 tons of fish. A-9-19

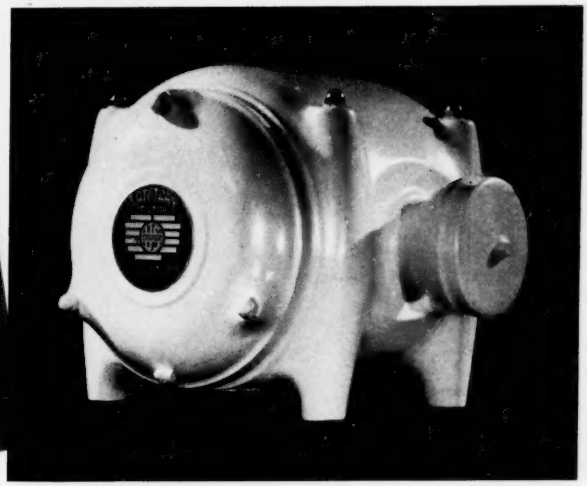


Worthington Ammonia Booster Compressor at Del Mar Canning Co.

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

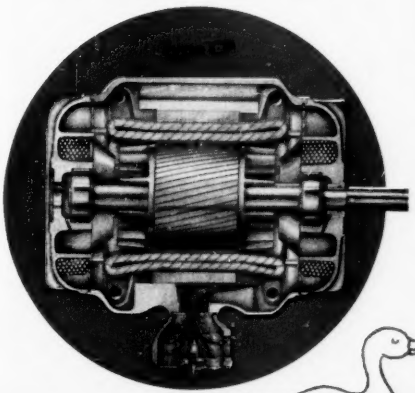
A complete line . . . in which *all* the vital components are made, not just assembled by Worthington. For more worth with Worthington, see your nearby Worthington distributor (consult Classified Telephone Directory).



A TOTALLY NEW CONCEPT OF CLEANLINESS FOR PRODUCT PROTECTION TO MEET EVERY DEMAND OF SANITATION AUTHORITIES

FOR EXTREME SANITATION

Where strict *sanitation* is a prime requisite and where equipment must be "hosed down," the new U. S. Sanitary Motor meets *all* requirements. It has been designed to comply with and actually exceed minimum specifications of sanitarians, and 3A standards. Beautiful in appearance and extremely immaculate, this revolutionary motor can be installed in any location without fear of damage from water or moisture. It is devoid of external pockets, grooves or any area where dirt or bacteria might collect. Its attractive external housing enhances the appearance of the driven machine.



Sheds water like a duck

UNMATCHABLE IN FLOWLINE PERFECTION

Note the absence of abrupt shoulders and crevices. There's no place where water or contaminants can lodge. The exterior is elegantly streamlined and immaculately finished in corrosion and abrasion-resistant baked white enamel. Joints are machined flush. Every part has been designed with meticulous care.

EASY TO INSTALL ANYWHERE

Although compactly designed, the feet are of sufficient length to permit ample clearance under the motor for easy cleaning. Can also be wall mounted.

U.S. Sanitary MOTOR

REQUEST FOR SANITARY MOTOR BULLETIN

U. S. Electrical Motors, Inc.,
200 E. Slauson Ave., Los Angeles 54, Calif.
or Milford, Connecticut

Send Sanitary Motor Bulletin. ☐ Prices

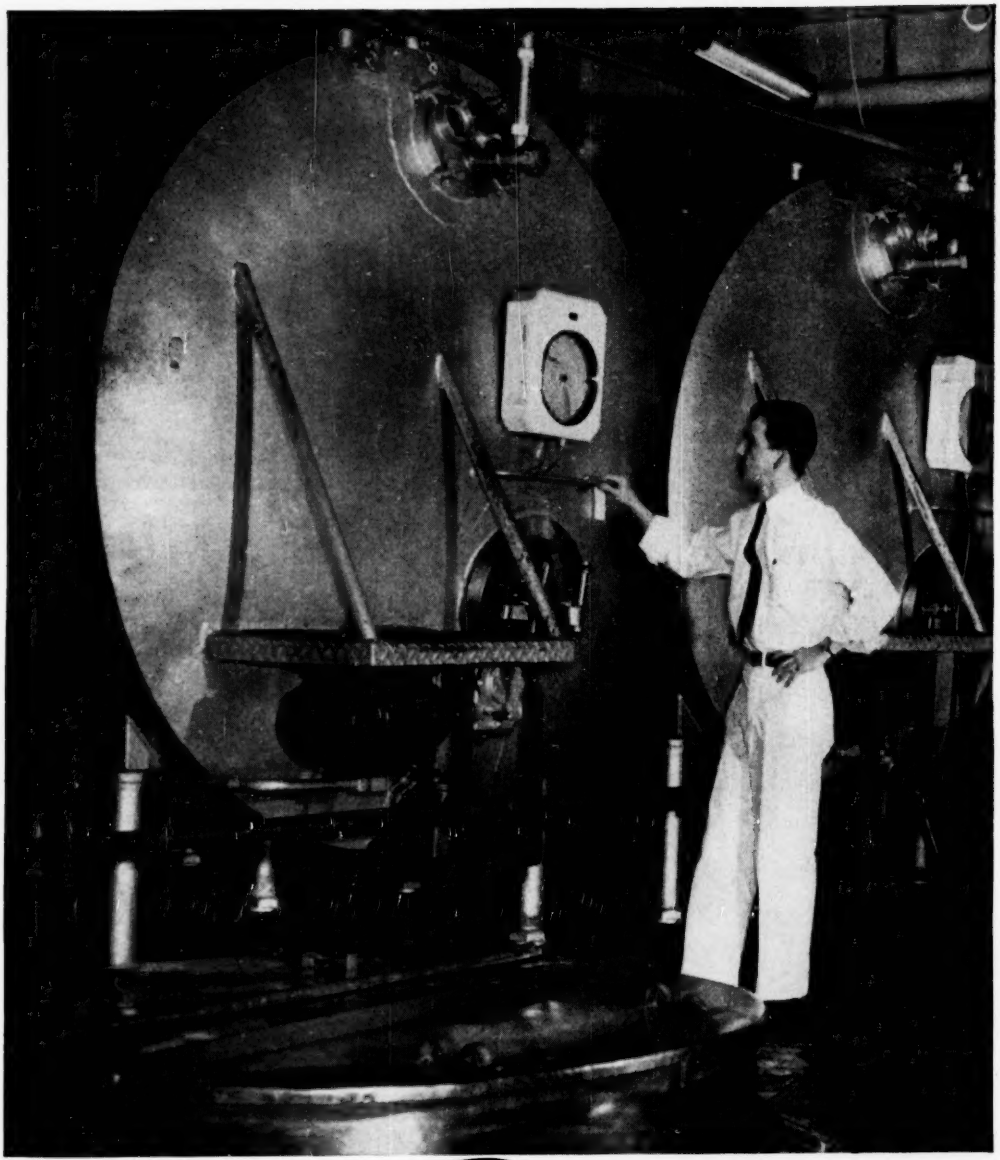
☐ Check here if also desire U. S. Varidrive Motor Bulletin

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE____



Enduro

REG. U. S. PAT. OFF.

REPUBLIC STEEL

STAINLESS STEEL HOLDING TANKS in this large midwestern ice cream plant protect product quality . . . are easy to keep sparkling and sanitary . . . require little or no maintenance. They are typical of countless cost-saving ENDURO applications throughout the dairy and food industries. Other applications include tanks, kettles, vats, hoppers, piping, valves, fittings—practically all types of processing and packaging equipment which come in contact with foods and food products.

Enduro-THRIFTY METAL OF 10,000 USES

EASY TO CLEAN... AND EASY TO KEEP CLEAN!

Gleaming, sanitary Republic ENDURO Stainless Steel is a material of many advantages—for many uses. High among the reasons for its universal adoption is its inherent cleanliness. This makes it easy to clean and easy to keep clean.

With ENDURO equipment, ordinary soap and water usually are all that's needed to restore its bright, non-contaminating surfaces. Under normal conditions, strong caustic agents and special scrubbing compounds are unnecessary to remove every trace of food oils or acids. Clean-up time—*costly non-productive time*—is cut to a minimum.

Check each of the 10 ENDURO advantages listed below. You'll quickly see why you save money in the long run by specifying ENDURO Stainless Steel on your new equipment orders. For detailed information, specifically related to your own operations, write us today.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • *Massillon, Ohio*
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

STAINLESS STEEL

✓ ***Check ALL 10 Advantages:*** • **RUST AND CORROSION-RESISTANCE • HEAT-RESISTANCE • HIGH STRENGTH • EYE APPEAL NO METALLIC CONTAMINATION • SANITARY SURFACES • EASY TO CLEAN • EASY TO FABRICATE • LONG LIFE • LOW END COST**

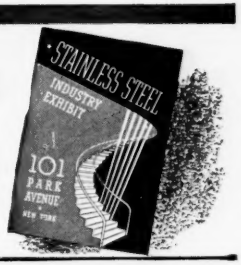
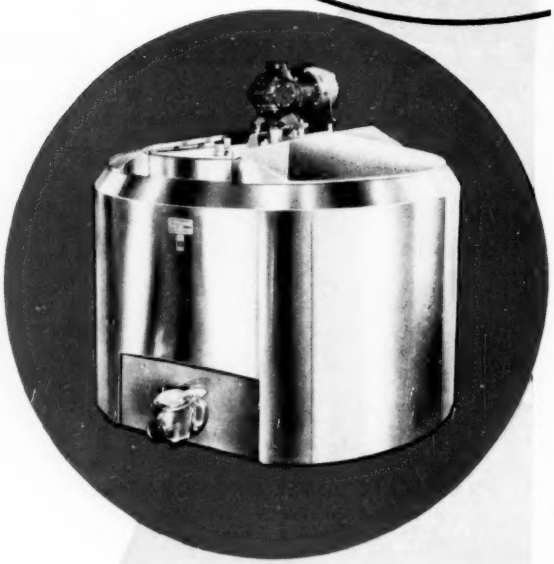


figure all the Angles and you'll get a CHERRY-BURRELL Round Processor



Now is the time to increase plant efficiency . . . improve your product and cut costs with a modern, multi-purpose Cherry-Burrell Round Processor. Here is an efficient, completely sanitary processor for mixing, heating, cooling, holding or pasteurizing a variety of products: liquid foods, syrups, salad dressings, beverages, etc. Extra heavy construction and simple design assure years of trouble-free operation with a minimum of maintenance. Consider these few among many outstanding *plus* features:

EXTRA FAST HEATING

Large heat transfer surfaces, patented spray type or direct steam heating assure fast, uniform heating and cooling . . . pasteurizing without "burn-on."

ADVANCED SANITARY DESIGN

. . . eliminates stuffing boxes, rotary seals and other unsanitary features. Smooth, easy to clean, all-stainless interiors. And the round shape saves space, too.

STRONG POSITIVE AGITATION

Powerful sweep type agitator swiftly circulates the product for faster, uniform heating. Ruggedly designed to handle the heaviest bodied product.

Send in the coupon today for complete details.

CHERRY-BURRELL CORPORATION
General Sales and Executive Office:
427 W. Randolph Street, Chicago 6, Ill.
Milk and Food Plant Equipment and Supplies
FACTORIES, WAREHOUSES, BRANCHES, OFFICES
OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES
trendmaker in a great industry

Cherry-Burrell Corporation
Dept. 117, 427 West Randolph St., Chicago 6, Ill.
Send Round Processor Bulletin.

Name.....

Firm Name.....

Address.....

City..... Zone.... State.....

DECEMBER, 1949

Food Industries

Problem of Chemicals Is Tough One for Processors

Food technologists are right smack up against one of the toughest problems the industry ever has been called upon to solve. There is irony in the situation, too, since the problem is one created by scientific advances. We refer to the potential and alleged health hazards resulting from chemicals in foods.

At the recent meeting of American Public Health Association, Dr. James R. Wilson, secretary of the Council on Foods & Nutrition of the American Medical Association, called particular attention to benzene hexachloride, which stays in some soils throughout the winter and may contaminate a second season's crop. He also put the finger on DDT, which tends to remain on the surface of fuzzy skinned fruits, or which may be excreted by dairy cattle into milk. And he called attention to thiouracil and thiourea, which have been suggested as aids to farmers in fattening meat animals.

As Dr. Wilson observed, the number of possible contaminants is growing rapidly, and knowledge concerning the safety or lack of safety of many is fragmentary.

In addition to accidental contamination of foods, there is the recently much-publicized problem of whether certain chemicals, such as emulsifiers, used as ingredients or conditioners in processed foods are harmless. There is evidence to indicate that certain emulsifiers not only are harmless but have nutritional value. However, this situation remains to be officially clarified. Food processors expect the bread standards, when eventually issued, to indicate the attitude of the Food & Drug Administration toward these so-called chemicals—and processors other than bakers are concerned. But at best, the bread standards will apply only to the specific chemicals considered at the bread hearings. Others used in the food industry, or yet to be introduced, will keep the problem hot for a long time to come.

The coming hearing on insecticides undoubtedly will help to clarify the problem of chemicals in foods, at least to the extent of consolidating the available data. That is why people in industry consider this hearing so significant and why they think it will be a long-drawn-out affair.

In any event, the problem of protecting consumers against new ingredients or contaminants in foods must rest to a large extent in the laps of food processors and those chemical companies which introduce new insecticides, ingredients or conditioners. Most manufacturers have accepted this responsibility, but a few have taken it too lightly.

It is the size of the job which makes it necessary that all take a hand. One authority estimates that adequate tests of all chemicals would tax the pharmacological facilities of the entire country.

Under the current food and drug law, a proposed new drug is banned from general use until its safety and efficacy has been established. And W. B. White, Chief of the Division of Food of the Food & Drug Administration, believes that some such device is badly needed for proposed chemicals.

There has been, he recently stated, a spontaneous demand for remedial legislation—from forces which cannot be ignored. Furthermore, resolutions have been put before Congress which call for an investigation of the present chaotic situation and recommendations for such legislation.

Everyone will agree that the answers to this problem of chemicals in foods must be found, but it does not represent an emergency because it is not that acute. Therefore, it should be handled with great deliberation. If it isn't, much damage can be done by adopting measures which will hamstring or block scientific progress in agriculture and in food processing.

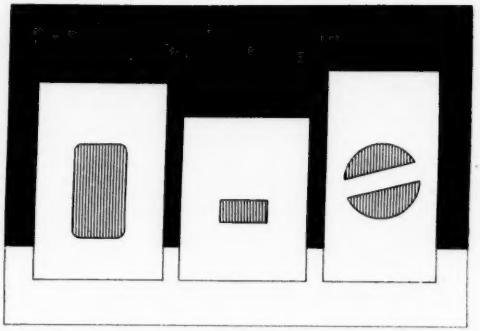
One does not envy food technologists, chemists and government officials the job that lies ahead of them. For, as Dr. Wilson expressed it: "One good hard-working chemist can create more problems than ten toxicologists can solve—and we don't have that many toxicologists."

—F. K. LAWLER, *Editor*

Check These Cardinal Factors ↓ →

Will a revamped label do it better?

Simplicity costs less, sells more—as in change from 5-color can (left) to new, attractive 3-color job (right).



Does that special feature really pay?

Scrutinize all "extras"—like these windows. They always add costs, don't always add enough sales to compensate.

Package Redesigning Can Save *Two* Ways

—First, by paring original packaging expenses. Second, by boosting sales, and thereby attaining new economies in the unit costs

JIM NASH

Package Designer, New York City

True enough, packaging costs have increased. But that's no reason why a processor should let his package expenses get beyond the bounds of good economies. Through proper redesigning, his costs can frequently be reduced and his package increased in effectiveness.

The Department of Commerce's latest quarterly Industry Report, *Containers & Packaging* says: "This industry (packaging) has expanded to such proportions that it is today one of the major basic industries in our national economy and makes a substantial contribution to the well-being of that economy."

Certain industries have flourishes of extravagance—in multi-color printing, expensive outerwraps, special shapes and sizes, and odd colors. And not infrequently, companies spend appreciable sums and yet secure very little value because proper planning and design have been neglected. Spending money this way involves waste due to failure to be effective. With pressure to reduce costs all along the line, the package designer can materially aid in effecting such reductions—while securing better results.

Cheapening of containers is false economy if the move results in decreased or static sales. But it is an economical achievement to increase sales by redesigning packages, while cutting costs or still maintaining the same costs. Actually, costs are lowered through increased sales. Naturally, the ideal is the double objective of reducing the original packaging costs and increasing sales into the bargain—thereby making a two-way cut in costs. From experience, we are convinced that this objective can be achieved by intelligent, planned package design.

As designers, our chief aim is to create the most effective design for a package at the least production cost.

Five Steps

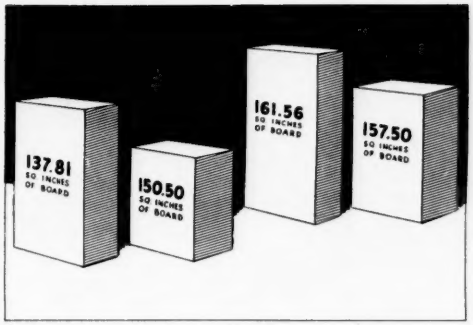
In going about a package-design, cost-reduction program, five aspects must be investigated: (1) Number and type of colors, (2) shape and style of package, (3) stock shapes, (4) unnecessary material costs, and (5) coordination of colors for combination runs.

Color is of value only in relation to its effective use. In too many cases, four and five colors have been used on the premise that many colors improve a package's appearance. But in most cases, the use of a multiplicity of colors is a waste of money. Unless the package design is well planned, colors—no matter what the number—will not make it appealing. Conversely, by using only three colors, the well-designed package can give the impression of more.

Another pet practice to which we commonly do not subscribe is the general use of special colors. However, we do employ them when the project specially warrants it and the cost is in keeping. Chief trouble with these colors is that they are difficult to maintain uniformly where presses run at high speed and where they must be printed on a variety of surfaces such as cellophane, parchment, Visking casings, coated label papers and cardboard.

Again we say, if the design is not outstanding, all the colors that are odd or difficult to print will not make the package attractive. For instance, one of our clients printed his own labels. On every label there was a common color—blue. But not the same blue. For no good reason, this firm had adopted 14 different shades of blue. By reviewing this white elephant, which had grown without notice, we reduced the multiplicity of blues to 3 different shades, thus making a considerable saving in production costs.

Appetite appeal—actual illustration of the product—is generally good



Have I got more package than I need?

Boxes on market vary in paperboard used for same goods. Packages on left show savings of from 12 to 23 sq. in.

How about a thrifty standard container?

Individuality marks special bottles (right). Good labeling will individualize less costly standard bottle (left).

and sometimes essential. Certain products require pictorial illustration to explain them and their use. In any case, two questions must be considered: First, does the product lend itself to good reproduction? For it's notable that some do not. Second, is the reproduction appealing? For one without appeal or poorly reproduced is better omitted, since the cost of reproduction is totally lost. If the reproduction is good, an additional color (or colors) has generally been used to complete the design. However, additional colors are not always necessary.

By careful planning, we have made some full-color illustrations from the basic colors used in the background and design of a package. In most cases, a redesign job would eliminate the extra colors and at the same time increase the package's effectiveness.

Another color extravagance is found in those trademarks which depend on color for identity. It has always been our contention that a trademark should be unique in shape, so that a particular color is unnecessary to its value. Actually, we encourage our clients to use their trademark in differing colors. Let the shape be what the buyer recognizes and remembers. If given this uniqueness—shape—the designer can keep the number of colors to a minimum, consistent with well-planned design.

The final saving in color costs can be attained through greater use of the two free colors—white and the extra one obtained through overprinting two or more of the basic design colors. In too many cases, additional colors are introduced when an effective treatment can be achieved by using the free colors. And the cheapest color—white—frequently is poorly used.

Next, consideration should be given to the package itself. Some products have been introduced with tricky packaging. But when the problem of volume eventually arises, these products are generally forced into standard shapes and sizes. Today, there are undoubtedly many packages "still going" that were adopted when container board was cheap and little attention was given to saving money through relatively slight alterations of basic shape to cut down on square inches of board per package.

However, one must bear in mind optical size, shelf space, and display face, all of which are important when the product is competing in the store. Once a happy medium has been reached—a shape that uses the least board, yet assures adequate shelf display—the designer can select and arrange type, colors, pictures, wrappers and the like, to create the optical illusion of a different shape to make the package stand out. These board-saving compromises have been developed to the point where they are now almost standard formulas. What the competition does may influence the matter, but we feel that design can go far in meeting competitive factors.

■ "Cheapening of containers is false economy if the move results in decreased or static sales. But it is an economical achievement to increase sales by redesigning packages, while cutting costs or still maintaining the same costs."

In considering stock-shaped bottles and jars, which are no doubt the most economical, we believe the design of the label can be the dominant factor. Here, ingenuity of the designer can be put to the greatest use. Stock shapes have been developed to produce the greatest economy, and they are run continuously. A relatively small label can be designed for creating an illusion of difference. It is noticeable that many industries use metal-foil labels where protection was not required, or they have used metallic inks—both expensive processes. Others have tried to overcome "sameness" by using many colors. In both instances, one should investigate whether the results warrant the additional costs.

As designers, we believe competitive results can be obtained through simpler labels. Embellishment is not the answer. Character, brand identity, and directness and ease of consumer choice make the standard shape a seller, reducing costs at the same time. This can be done only through design.

Are Added Costs Justified?

In any study on reducing packaging costs, it should be determined whether all the various materials used are really needed—whether the benefits warrant the cost saleswise. For instance, one of our clients had a liking for putting a window in one of his cartons. Upon investigation, it was found that the cost would amount to many thousands of dollars per square inch per year. After figuring out how many square inches per package would be required, the project was dropped. We hasten to say that this is not an argument against window cartons. This was merely a specific case where costs and profits just did not work out.

With the free return of materials after wartime shortages, it is possible that the tendency to overdo got the upper hand. More colors, inner wraps, and outer wraps were used with cost no object. As more normal conditions

(*Turn to page* 196)

Promote Product A or B? Cut Output of Plant I or II? Here's Way to Right Answers

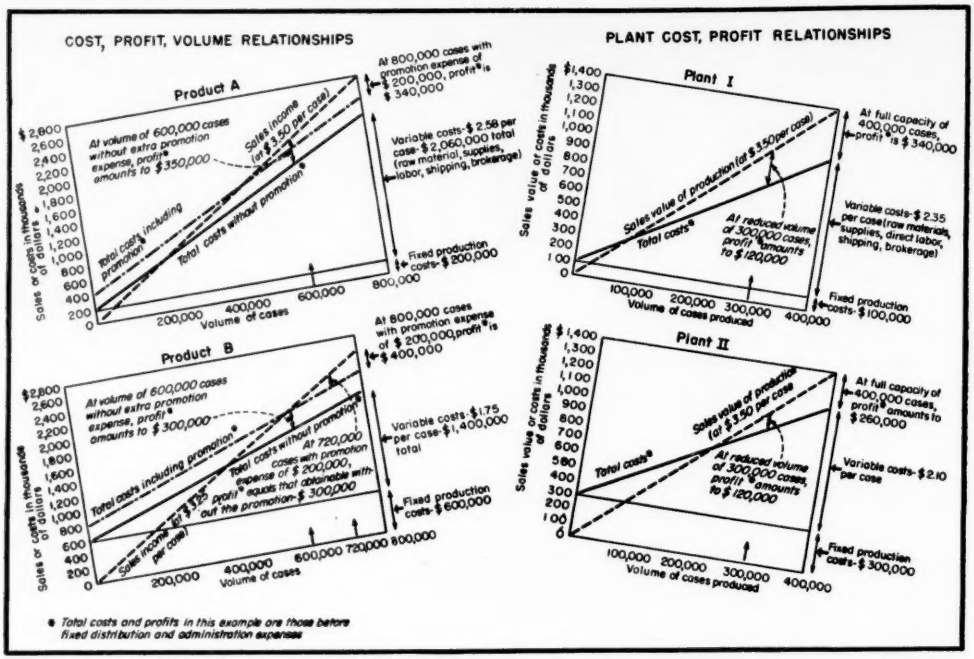

COST, PROFIT, VOLUME RELATIONSHIPS
Product A
Sales or costs in thousands of dollars
Volume of cases
At volume of 600,000 cases without extra promotion expense, profit* amounts to $350,000
Sales income (at $3.50 per case)
Total costs (including promotion)*
Total costs without promotion*
At 800,000 cases with promotion expense of $200,000, profit* is $340,000
Variable costs-$2.58 per case-$2,060,000 total (raw material, supplies, labor, shipping, brokerage)
Fixed production costs-$800,000
Product B
At volume of 600,000 cases without extra promotion expense, profit* amounts to $300,000
Total costs including promotion*
Total costs without promotion*
At 720,000 cases with promotion expense of $200,000, profit* equals that obtainable without the promotion-$300,000
At 800,000 cases with promotion expense of $200,000, profit* is $400,000
Variable costs-$1.75 per case-$1,400,000 total
Fixed production costs-$600,000
PLANT COST, PROFIT RELATIONSHIPS
Plant I
Sales value of production (at $3.50 per case)
Total costs*
At reduced volume of 300,000 cases, profit* amounts to $120,000
At full capacity of 400,000 cases, profit* is $340,000
Variable costs-$2.35 per case (raw materials, supplies, direct labor, shipping, brokerage)
Fixed production costs-$100,000
Plant II
Sales value of production (at $3.50 per case)
Total costs*
At reduced volume of 300,000 cases, profit* amounts to $120,000
At full capacity of 400,000 cases, profit* amounts to $260,000
Variable costs-$2.10 per case
Fixed production costs-$300,000
* Total costs and profits in this example are those before fixed distribution and administration expenses

FIG. 1. TWO GRAPHS at left show cost-profit-volume relationship for two products, where promotion to increase sales of one or both is under consideration. Analysis indicates promotion is justified for Product B, but not for Product A. Graphs on right analyze cost-volume relationships in a two-plant operation, where one or both must be restricted to less than capacity production. Analysis shows why Plant II should be operated at full capacity, even though conventional cost sheet might indicate Plant I. It is the variable, not fixed costs, that make difference here.

Cut Pack Costs—With Planning Control

Fact is that conventional cost sheets can fool you—unless production plans have been developed right from top management down through plant foremen

DOUGLAS WATSON and KENNETH M. CUTHBERTSON
McKinsey & Co., Management Consultants, San Francisco

A minor revolution is occurring in the seasonal packing industry: The old idea that you do not control seasonal pack costs—that they just happen—is giving way. Cost consciousness and cost control are increasingly important elements in the successful production manager's operations.

For the past ten years, the plant manager has almost exclusively devoted his efforts to the physical aspects of processing the seasonal receipts of fruits and vegetables—cost has been less important. The lack of manpower, shortage of cans and glass and sugar, and extremely heavy demands for finished goods upset the normal balance between cost, quality and production. Cost, and in some cases quality, have suffered in the effort to maximize production. But large carry-overs of finished goods and increasing consumer price resistance are forcing high quality production at low cost these days.

Planned Control

Low cost production does not merely happen. It is the result of intensive planning and control from top management right down to and including the plant foremen.

Sound cost and production plans must be made in three basic organization areas, and adequate control must follow the planning. These areas are:

1. Profit planning by top management: This top-level phase of planning involves both sales and production. Essentially, it requires estimating costs at various volume levels and comparing these costs with forecasted prices at several sales volumes. As a result of this step, the over-all pack plans are developed and product quantities for each grade are determined. This sets up the "battle plan" for the sales year. The plan then goes to production management for further detailing.

2. Pack campaign planning by production management: In those companies with multi-plant operations, this

is a most important cost planning step. Using the basic sales plan as a guide, production management, with the cooperation of the plant managers, determines the availability of raw material, the ability of the separate plants to produce at low and competitive cost, and the time when the goods are to be produced in terms of the demand for the finished product.

3. Operation planning and control by plant management: Once the pack campaigns have been determined, the low cost preparation of finished goods in final form for the consumer becomes a plant problem.

Plant plans are made on a current day-to-day basis in contrast to the profit and campaign plans, which are made before the pack is underway. To maximize his profits, the plant superintendent must make decisions on the spot as the season progresses. He bases these decisions on knowledge of how his costs are affected by variations in quantity and quality of incoming raw materials and ingredients, the availability of labor, and by the quality and quantity of finished goods he must produce.

All of these planning steps must be taken if the final product is to be produced at lowest cost and seasonal plant costs are to be controlled.

Profit Planning

Cost control begins with top management. Costs and cost limits play an important part in planning the year's sales and operations. They are matched against demand to establish the relative profit opportunities of alternative programs. This is all part of setting a company's annual profit objective by means of an over-all plan.

Three major steps lead to establishing a tentative master profit plan. First, a forecast of product sales prices and volume; second, a forecast of production cost elements, and third, a comparison of sales and costs to develop a plan with the maximum profit potential.

The sales forecast is obviously the starting point in over-all planning. Coupled with carry-over information, it will set the limits of the production program. Sales forecasting, which is not the subject of this article, will consider such matters as general economic conditions and trends, company position in the industry, and special promotional efforts. It may well result in several forecasts of volume depending upon the estimated price levels. These varying estimates can be compared with costs expected to result from the related production volumes.

Forecasts for production cost elements are concerned mainly with raw material and labor. Standards of usage for raw product and labor should be available in terms of physical units such as pounds per case or hours per case. These standards can be converted to estimated costs only after an analysis of what crop prices and hourly labor rates are likely to be.

The third step—comparing sales and cost opportunities—uses the forecast data to establish a sales and production plan that will produce the greatest profit. When the management selects the most profitable operating plan, the cost bases used in setting the plan become the cost goals that production management must endeavor to meet during the year.

Important Cost-Volume Relationships

This third step is a most critical one. In the seasonal packing industry, it is particularly important to recognize how cost-volume relationships affect profits. The industry incurs many production costs, which are fixed for the year even though the packing season may be only a small part of the year. Such costs as plant supervision, key men, equipment depreciation, maintenance and occupancy are examples.

The relative amount of these fixed costs may vary for different products. Some may require more expensive plants and machinery, with possibly lower labor costs. Too often the significance of fixed costs and the cost-volume relationship is neglected in the analysis of product profitability. A somewhat simplified example will illustrate the type of planning approach that recognizes these cost factors.

Company X packs several products. Sales forecasts indicate that with a special promotional effort costing $200,000 the sales of *either* Product A or Product B could be boosted 200,000 cases at the same sales price. Management seeks to determine whether the promotional effort is worthwhile and which product should be pushed. Without the extra promotion, sales of each are expected to be 600,000 cases, which equals the past year's results. The following schedule shows Company X's profit potential if the $200,000 is not spent for promotion:

	Product A	Product B
Volume	600,000 cases	600,000 cases
Sales price per case	$3.50	$3.25
Sales	$2,100,000	$1,950,000
Fixed production costs	200,000	600,000
Variable production and distribution costs	1,550,000	1,050,000
Total costs before fixed distribution & administrative expenses	$1,750,000	$1,650,000
Profit before fixed distribution & administrative expenses	$350,000	$300,000
Percentage of sales	16.7%	15.4%

Fixed production costs include those annual plant expenses, the total of which will not vary due to volume during the packing season. Product B carries relatively higher fixed costs because it is more susceptible to mechanized operations, requiring large capital investments.

Variable production and distribution costs include raw material, packaging and other supplies, labor, shipping and sales brokerage. These amount to $2.58 per case for Product A and $1.75 per case for Product B. The *per-case* amount of these variable costs remains practically constant; the *total amount* of these costs therefore varies

To Sort Or Not To Sort—This Curve Will Tell

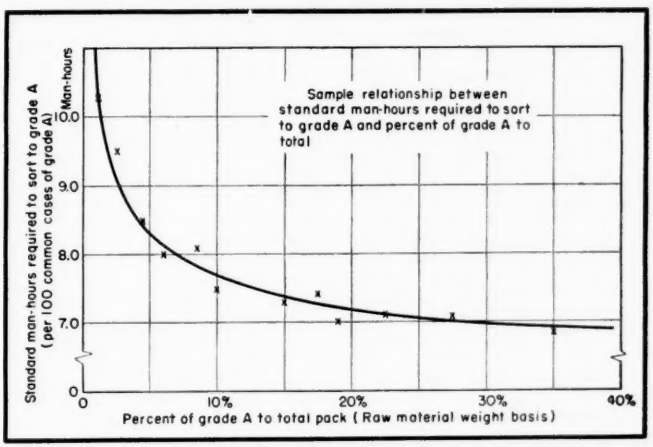

Standard man-hours required to sort to grade A (per 100 common cases of grade A)
Man-hours
10.0
9.0
8.0
7.0
0
Sample relationship between standard man-hours required to sort to grade A and percent of grade A to total
0
10%
20%
30%
40%
Percent of grade A to total pack (Raw material weight basis)

FIG. 2. AFTER sampling has determined approximate grade mix, a chart of this kind can tell you if sorting out higher grade material will pay off.

directly with volume. The "profit" figure shown is really the contribution which each product makes to cover fixed selling and administrative expenses and to provide ultimate net profit.

As shown in the above schedule, Product A carries the higher sales price per unit. At last year's volume, it returns a greater dollar profit and a greater profit as a percentage of sales. A decision as to which product should have the extra promotion might be made in favor of Product A if the analyses were based on conventional operating statements, which do not clearly separate fixed and variable costs.

Because of the existing cost-volume relationships, however, Product B is the one whose volume should be increased. The following table shows, for each product, the effect of the increased volume on profits resulting from the additional promotion:

	Product A	Product B
Volume	800,000 cases	800,000 cases
Sales price per case	$3.50	$3.25
Sales	$2,800,000	$2,600,000
Fixed prod. costs	200,000	600,000
Variable prod. and dist. costs	2,060,000	1,400,000
Cost of additional promotion	200,000	200,000
Total costs & administrative expenses	$2,460,000	$2,200,000
Profit before dist. and admin. expenses	$340,000	$400,000
Percentage of sales	12.1%	15.4%

This indicates that the increased promotion and volume for Product A would result in $10,000 less profit than before. It is worthwhile, however, for Product B, and would increase profits $100,000.

The cost-profit-volume relationships involved in this analysis are shown in the upper part of Fig. 1. Graphic presentation is desirable in analyses of this type because it makes cost and profit situations at various volumes readily observable.

In this example, the curves for Product B show the added promotion expense to be worthwhile at a volume of 720,000 cases. At that point, "profit" is $300,000, or equal to the "profit" obtainable at the 600,000 case volume without the additional promotion expense. In other words, the promotion expense will yield additional profits if it increases volume by more than 120,000 cases. Since our Company X example shows a potential increase of 200,000 cases, it definitely is desirable.

This example merely illustrates the cost-volume approach to one problem. It can and should be used throughout profit planning, which eventually leads to an over-all plan for the year. This resulting plan, which establishes production volume and cost goals for all products, is then referred to production management for more detailed planning.

Pack Campaign Planning

This stage of forward cost planning is of great importance in companies with multi-plant operations. Using the tentative over-all sales plan, production management must determine where each product is to be packed. In the seasonal packing industry, this problem is complicated by overlapping product seasons. The planning problem is one of analyzing the many alternatives in order to achieve lowest costs and maximum profits.

Production management needs additional detailed information—considerably more than that used in the over-all sales planning. The timing of crop maturities is essential in scheduling plants for the various products. The location of raw materials sources and finished goods markets affects transportation costs to and from the various plants. Finally, knowledge of the cost performance at individual plants is also essential to effective campaign planning.

Generally, this last type of information has not been available in sufficient detail. Plant cost performance must be built up in terms of the standards and the adequate classifications discussed later in this article.

Here again, cost performance data sholud be arranged to allow analysis of the cost-volume relationships. Individual plant fixed costs can be a major consideration in the selection of plants for specific products. An illustration may be helpful:

Company Z has developed an over-all sales plan calling for 700,000 cases of Product C. The product can be packed at Plants I and II. Each has a normal capacity of 400,000 cases for this product during the expected eight-week season. The over-all sales plan does not require the 100,000-case excess capacity. Therefore, production management must decide which plant is to operate below capacity. In the past, both plants operated at full capacity for Product C. Although Plant I has shown a higher labor cost per case, it has been the most profitable, due to lower fixed costs.

Form Pins Down Volume and Labor Aberrations

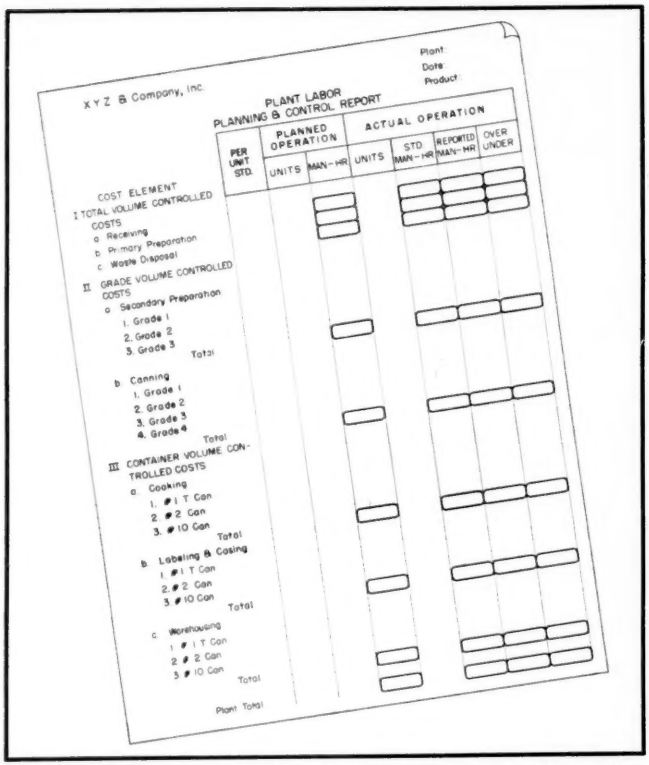


FIG. 3. HERE is one way to combine labor cost control report with daily planning report to identify and isolate two variables—volume and efficiency.

Cost performance data indicate that *at full capacity,* as in the past, the following results could be expected at each plant for Product C:

	Plant I	Plant II
Sales value of prod., 400,000 cases at $3.50 per case	$1,400,000	$1,400,000
Fixed prod. costs (allocable to 8-week season)	100,000	300,000
Variable prod. & dist. costs	940,000*	840,000**
Total of these costs	$1,040,000	$1,140,000
Profit before fixed dist. and admin. expenses	$360,000	$260,000
As a percentage of sales value	25.7%	18.6%

* @ $2.35 per case. ** @ $2.10 per case.

The lower variable costs at Plant II result from a lower labor cost per case and lower freight costs because of better location with respect to raw materials and markets. Plant II's higher fixed costs are due to large investment in improved buildings and mechanical processing equipment.

With a conventional classification of costs, it is likely that Plant I's higher rate of profit would indicate that it should be assigned to full capacity and Plant II's volume reduced. The breakdown above, however, accents the fact that differences in fixed costs make a cost-volume analysis essential.

Production management should have cost performance data for Product C at Plants I and II in the graphic form shown. These charts, based on predicted costs for the coming season, show how a reduction of volume at either plant will affect total costs and profits. In this way, the best production schedule to fit into the campaign can be selected.

Analysis of the plant graphs in Fig. 1, shows that Plant II should be scheduled to full capacity and Plant I's volume reduced 100,000 cases. This combination would produce profits (before fixed distribution and administrative expenses) of $245,000 at Plant I and $260,000 at Plant II—a total of $505,000. The alternative of reducing Plant II's volume 100,000 cases and running Plant I at full capacity would result in profit figures of $360,000 at Plant I and $120,000 at Plant II—a total of $480,000. The correct decision in this case can mean a difference of $25,000 in profits for this one product alone.

Campaign planning problems are seldom as simple or isolated as the one just outlined. But the approach illustrated can be applied to the more complex situations. With a knowledge of the cost-volume relationships for each product at each appropriate plant, management can weigh alternative production plans to achieve the greatest over-all profit.

This type of planning is really cost control at a high level. Control is achieved by taking every opportunity to select, in advance, the lowest cost campaign plan. These costs then become the operating cost goals for each plant during the season.

Both the over-all sales plan and the production campaign plan need to be flexible, since they may be subject to revision during the year. Changes may occur in market prices or in cost elements such as raw material or labor. The tentative sales and production plans must be re-studied in the light of such changes. As plans are revised, the new objectives should be relayed to plant managers so that these men are at all times informed of their production volume and cost goals.

Operations Planning and Control

Adequate profit and campaign planning require advance determination of fixed and variable costs. Plant planning and control have the same requirement. How can these costs be predicted?

The fixed costs for the plant are relatively easy to determine, because they are not ordinarily subject to wide variation from year to year. Reference to historical data modified by any recent changes will form the basis for budgets of the fixed expenses. Since these costs do not fluctuate frequently, they can be controlled by means of monthly comparisons of actual cost versus the budget or planned amounts.

The variable plant costs are subject to much greater and more frequent fluctuation. Therefore, they must not only be forecast with accuracy but must be checked much more frequently than fixed costs in order to achieve adequate control.

These variable costs are not only markedly affected by the variations in production level or product mix, but are also substantially changed by variations in ingredient and supply prices, maintenance part costs, and labor rates. For this reason, the simpler budgeting technic used for forecasting fixed costs must be modified for these variable costs.

As a first step in establishing standards for variable costs, operations should be analyzed on a step-by-step basis. This analysis should result in the determination of cost centers. If control is to work well, each cost center should be under the complete responsibility of a foreman or supervisor so that he can be held completely accountable for results of that particular operation. Furthermore, these centers should be so established that their costs can be added together in various combinations to obtain total available costs for any given process.

For effective variable cost forecasting, standards should be developed in terms of physical units, such as man-hours for labor, pounds for raw material and ingredients, and units for containers. Some of these standards are relatively easy to determine, such as time per ton required for receiving fruit, or the amount of sugar to be used per case of peaches of a specified syrup content.

Other operations, such as grade sorting, canning, and certain cookroom activities, are more complex. In these cases, the standards are somewhat more difficult to establish. There are, however, technics that can be used to determine how much time is involved in these activities.

For example, in Fig. 2 a typical relationship between grade sorting, man-hours and volume has been determined. This information, developed from time studies of a sorting operation, is expressed in terms of man-hours so that sorting costs can be predetermined once the labor rate is known and the grade mix approximated. Similar time standards can be developed for many of the important process steps and used not only to predetermine plant costs, but also to plan for current plant operations and to control plant results.

Standards for Planning and Control

Control information by itself is of no value unless it is put to work. The facts developed under a program such as this can be used by the plant manager for two important portions of his job: Daily operations *planning,* and current operations *control.*

The good plant manager not only plans the work to be done tomorrow, but also constantly evaluates the work that was done yesterday and is being done today. This aspect of control is the follow-up on the plan, and it serves as a basis for modifying the basic production program to achieve the lowest over-all cost.

Daily Operations Planning

With the facts available as to the quantity and quality of material to be received using these standards, the plant manager can very quickly establish sound operating plans.

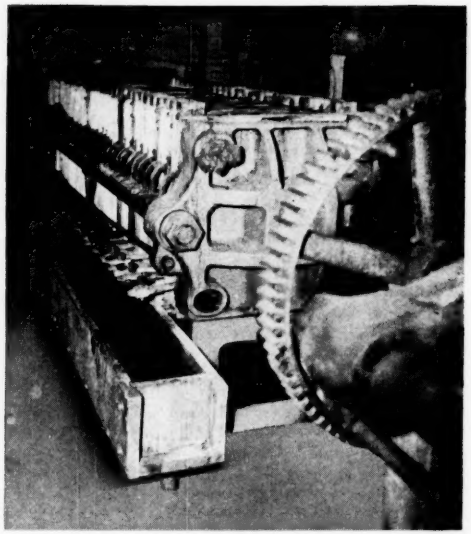
Since most seasonal packing operations are of the "process" type, it is relatively simple to work out the form that these daily operations plans should take. The amount of detail required to set up this type of plan can be held to a minimum. It is of a simple nature and can be absorbed into the normal office routine without much difficulty.

This Plant Labor Planning and Control Report, developed at XYZ & Co. is made available to the plant manager on a daily basis. It compares the man-hours actually used with those called

(*Turn to page* 197)

Photo-brief of vinegar-purging method ⟶

1 IN 30,000-gal.-tank lots, vinegar is treated with calcium phytate to precipitate copper and iron salts.



2 FILTRATION removes precipitated phytates. Result: vinegar with only 2.5 ppm. iron and less copper content.

Takes Heavy Metals Out of Acid Foods

New method uses calcium and sodium phytate to precipitate iron and copper from vinegar, points way to further successes in removal of metallic traces

R. F. COHEE, JR., and GEORGE STEFFEN
Corn Products Sales Co., and M. Steffen & Co., Chicago, respectively

As a result of a new method for refining vinegar, attractive possibilities are now seen for use of chemical precipitation and filtration for quantitative removal of heavy trace metals from acid liquid foods and materials used in connection with food processing.

This method includes employment of sodium or calcium phytate to take out copper and iron as insoluble phytates from both white distilled and cider vinegars.

The possible effectiveness of sodium or calcium phytates for the removal of other metals is yet to be determined. But, it is known that sodium phytate in water solutions reacts with soluble salts of many metals to give practical quantitative yields of the corresponding insoluble phytates—metals of the alkali series excepted.

Among the relatively large number of other known insoluble phytates are those of aluminum, barium, beryllium, cadmium, chromium, cobalt, lead, magnesium, mercury, nickel, silver, tin and zinc. Several of these are of interest in food processing, particularly where there is aid in the removal of trace metal "trouble makers". However, more studies must still be made to determine their order of solubility under the various conditions encountered in processed foods—especially under different concentrations of acidity.

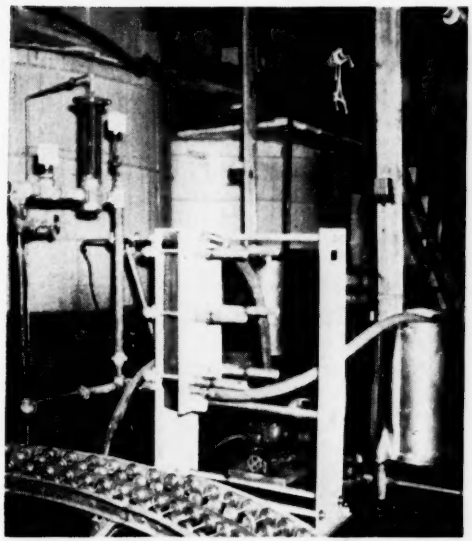
Out of Necessity

The application of the phytate method to the treatment of vinegar was, in a way, the old story of necessity being the mother of invention. To a great extent, it was the result of the senior author's recalling that iron phytate, because of its insolubility, had been discarded as an enriching form of iron for white flour and bakery products.

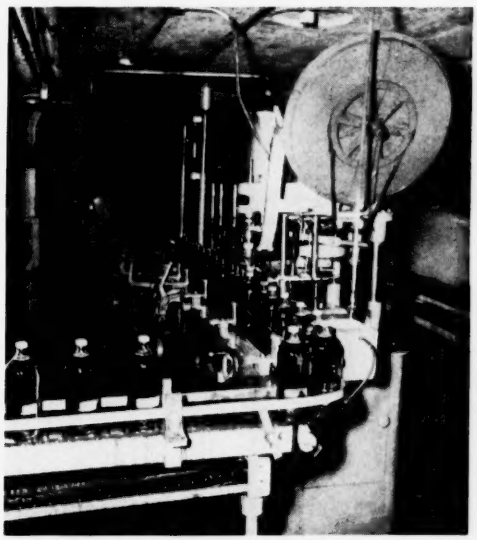
Here is how it all came about: Early in October 1948, a large quantity of cider vinegar had been found to be too high in iron salts to be bottled without danger of haze, discoloration and precipitation. The iron content of this vinegar was found to be in the range of from 25-30 ppm. Previous experience had indicated that 10 ppm. of iron sometimes proved troublesome in vinegar and that the standard on cider vinegar should be below 8 ppm.

Clarification with gelatin and tannin had been tried unsuccessfully. Activated carbon had removed about half of the iron content—but it also removed the color from cider vinegar. Bentonite-casein clarification, as suggested by Saywell[1], was also tried; however, it left a too-high iron content. Use of potassium ferrocyanide fining was, of course, a possible metal-removing procedure, but this was considered extremely unsuitable for several reasons.

In addition, the use of various ion-exchange resins was thoroughly explored. And two types were found to remove iron and copper. Yet, a simpler and less expensive method



3 **PASTEURIZATION** prevents microbe-caused cloudiness. It also improves the color of the vinegar.



4 **CRYSTAL CLEAR** vinegar goes into bottles, which protect product against subsequent contamination.

was needed. Preliminary calculations showed that the iron content of commercial bottled vinegar could be reduced to under 3 ppm.—if the proper procedure was followed to precipitate the iron as phytate.

Method With Vinegar

Briefly, the method for vinegar consists in adding the proper amount of calcium or sodium phytate to react with the iron and copper salts present. As an example, 1.25 lb. of calcium phytate added to 1,000 gal. of vinegar containing 25 ppm. of iron and then heated to about 180 deg. F. causes precipitation of the iron. This procedure reduces the iron content to about 2.5 ppm. after filtration. At the same time, the copper content is also markedly reduced.

It should be added that the addition of phytates to vinegar caused a cloudy flocculation, which was easily filtered out in laboratory as well as in the plant-scale operations.

In Table I is given the amount of calcium phytate to add to 1,000 gal. of vinegar of definitely known iron content. Roughly speaking, about the same amount is necessary to remove equal ppm. of copper. Plenty of time for storage of the vinegar should be available so the reaction can go to completion.

Although sodium phytate might have been used, the cheaper salt, calcium phytate, was chosen for this experimental work. This chemical deserves serious consideration as a means of overcoming difficulties due to the presence of trace metals which are less soluble as phytates than in the form of other salts in similar acid media. Calcium phytate solubility in dilute organic acids is sufficient to make it effective as a heavy metal remover.

Calcium phytate was found to be soluble in 5 percent acetic acid or 50-grain cider vinegar to the extent of about 0.5g. per 100cc., which is equivalent to 5g. in a liter. This solubility is greater by far than that needed to treat any vinegars or other materials so far studied.

One of the biggest objections to the general use of calcium phytate is that its commercial form is contaminated with iron. However, in the case of vinegar, this objection is easily overcome because a waiting period is possible in which an almost total precipitation of all iron present can be obtained before the vinegar is used.

Calcium Phytate Cheaper

During the course of the tests in the laboratory, practically iron-free sodium phytate was used, and the time element was not a factor with its use. The relative prices of sodium and calcium phytate decidedly favor the use of calcium phytate for use in vinegar, even when a 30,000-gal. tank of vinegar might be treated. The reaction can be speeded up by heat. Also, a two-weeks' waiting period was found to be sufficient to reduce the iron content to a relatively low level on a commercial scale. Indication of the relative time taken to remove the iron from cider vinegar is found in Table II.

Disclosed in Table III are the results of treating a badly contaminated white distilled vinegar with successive portions of calcium phytate. These results indicate, as other data had shown, that copper is harder to precipitate as a phytate than is iron. After three days of successive additions and heatings to 180 deg. F., the copper was reduced to 20 ppm. and was still precipitating slowly. Thus, it appears that copper phytate under the acidic conditions of vinegar is more soluble than iron phytate or, at least, is held in solution much better.

In order to arrive at a rough idea of the quantitative relationships involved, a cider vinegar high in iron and copper was treated with three different quantities of both calcium and sodium phytate, as indicated in Table IV. These various combinations were heated to 180 deg. F. Then, the precipitate was allowed to flocculate and settle, and the residue was collected and weighed. After the filtrates had set for a week, more precipitate formed, was filtered out, and was also weighed. The ashed residues indicated that the iron and copper were being removed in the precipitates. The data in Table IV indicate the almost quanti-

tative relationships found when either calcium or sodium phytate is added to a vinegar high in iron and copper.

Heating the mixture of calcium phytate and vinegar to 180 deg. F. speeded up the reaction considerably. Heating is feasible in most vinegar plants, since the necessary heat exchangers are easily available. Table V gives the results of analyses on several treated vinegars from different sources. They were heated after adding the calcium phytate, held to permit the precipitate to settle or develop, filtered, and analyzed at various intervals.

In some vinegars, the addition of calcium phytate had a tendency to reduce the amount of color. The cloudiness developed by the flocculent precipitate seemed to carry down part of the coloring matters in the vinegar. For this reason, the tannin and coloring values on several vinegars were determined before and after treatment. Also, the colors of the vinegars before and after treatment were measured, using the Nissen[2] method. In Table VI are given the color and tannin levels before and after treatment of vinegar with calcium phytate.

Table VI data shows that care must be exercised—for a cider vinegar too light in color may result if the vinegar is not handled properly. This likelihood is an additional argument for heating, which helps to add color to the vinegar. The reason for this is that the iron phytate formed by the addition of the calcium phytate to vinegar is so insoluble that it apparently carries the ferric tannin complexes down with it in some cases.

Other Possibilities

In order to investigate the possibility of removing other trace metals—such as copper and lead—sometimes occur-

(*Turn to page* 199)

TABLE I—AMOUNT OF CALCIUM PHYTATE to Add to a Vinegar of Definite Iron Content

Iron In PPM.	Grams Calcium Phytate for 1 Liter	Grams Ferric Phytate Expected from 1 Liter	Grams Calcium Phytate Needed for 1,000 Gal.	Pounds and Ounces of Calcium Phytate Needed for 1,000 Gal.
5	0.02	0.0194	75.7	2.67 oz.
10	0.04	0.0388	151.1	5.34 oz.
15	0.06	0.0582	227.1	8.01 oz.
20	0.08	0.0776	302.8	10.68 oz.
25	0.10	0.0970	378.5	13.35 oz.
30	0.12	0.1164	454.2	1 lb. 0.02 oz.
35	0.14	0.1358	529.9	1 lb. 2.69 oz.
40	0.16	0.1552	605.7	1 lb. 5.36 oz.
50	0.20	0.1940	757.0	1 lb. 10.70 oz.
60	0.24	0.2328	908.4	2 lb. 0.04 oz.
75	0.30	0.2910	1135.0	2 lb. 8.05 oz.
100	0.40	0.3880	1514.0	3 lb. 5.40 oz.

TABLE II—PROGRESS of Large Scale Treatments of Cider Vinegar With Calcium Phytate (no heat)

Date	Chronology of Tests	Iron Content And Percent Removed: Tank No. 6	Tank No. 9	Tank No. 14
5-21-49	Iron content before treatment, ppm.	25.0	25.0	25.0
5-26-49	Iron 5 days after treatment, ppm.	12.0	7.0	12.0
	Iron removed, %	52.0	72.0	52.0
6-3-49	Iron 14 days after treatment, ppm.	3.0	4.0	3.0
	Iron removed, %	88.0	84.0	88.0
8-23-49	Iron at time of bottling vinegar, ppm.	2.5	2.5	2.5
	Iron removed, %	90.0	90.0	90.0

TABLE III—RELATIVE RATE of Iron and Copper Removal From a White Distilled Vinegar

Date	Treatment	White Vinegar: Appearance	Iron ppm.	Copper ppm.	Remarks
8-26-49	None (start)		40	60	
8-26-49	0.1g. calcium phytate/100 c.c. Heat to 180 deg. F., let stand 15 min., filter	Heavy ppt.	12	30	Neither ppt. complete
8-26-49	0.1g. calcium phytate/100 c.c. Heat to 180 deg. F., let stand min., filter	Heavy ppt.	3	25	
8-28-49	0.1g. calcium phytate/100 c.c. Heat to 180 deg. F., let stand until 8-28-49	ppt.	1	20	Iron ppt. complete. Copper still precipitating

Tables Tell Story: Phytates + "Traces" In Vinegar = Metal Precipitates

TABLE V—EFFECT of Time and Temperature on Rate of Reaction of the Calcium Phytate Upon White and Cider Vinegars

	Distilled White Vinegar		Cider Vinegar							
	Date	ppm.	#1	Date	#2	Date	#3	Date	#4	Date
Iron before treatment, ppm.	8-25	4.00	9	8-25	40	8-10	30.0	8-25	25.0	7-23
Iron after treatment, ppm.	8-26	2.50	4	8-28	5	8-17	12.5	8-26	2.5	8-23
Iron after treatment, ppm.	....	....	..	....	..	....	7.0	8-28	....	....
Iron after treatment, ppm.	....	....	..	....	..	....	6.0	9-3	....	....
Copper before treatment, ppm.	8-25	1.50	10	8-25	..	....	35.0	8-25	35.0	7-23
Copper after treatment, ppm.	8-26	1.25	4	8-28	..	....	25.0	8-26	5.0	8-25
Copper after treatment, ppm.	....	....	..	....	..	....	20.0	8-28	....	....
Copper after treatment, ppm.	....	....	..	....	..	....	2.0	9-3	....	....

TABLE VI—COLOR AND TANNIN Levels Before and After Treatment of Vinegar with Calcium Phytate

Cider Vinegar Number	Color* Before Treatment	Color* After Treatment	Tannin Before Treatment, %	Tannin After Treatment, %
1	6.0000	3.0000	0.0249	0.0166
2	4.0000	3.5000	0.0270	0.0249
3	5.0000	5.0000	0.0270	0.0166
4	6.0000	2.5000	0.0249	0.0124

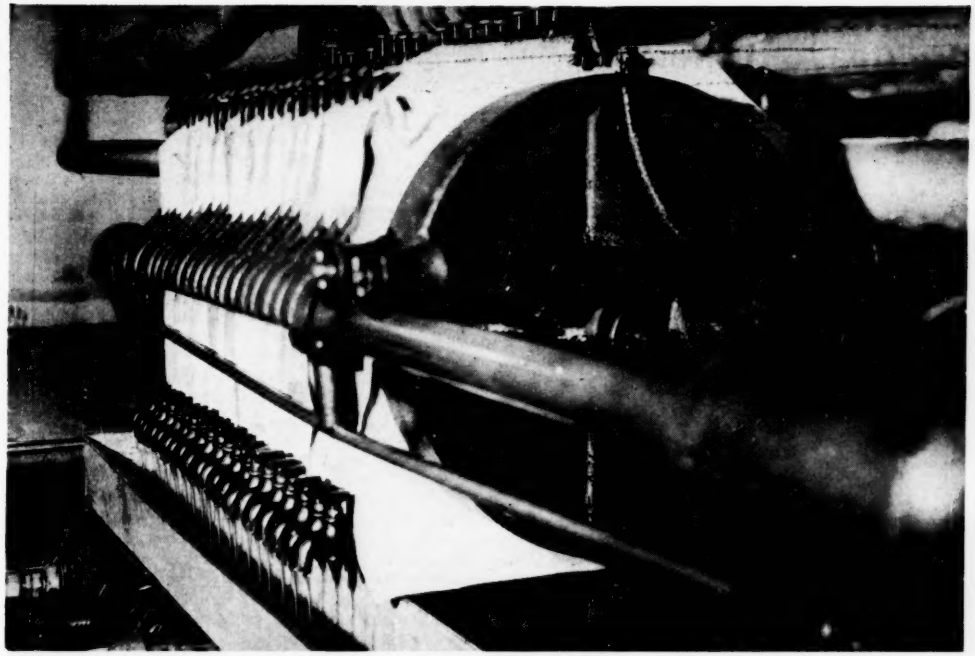
*In arbitrary units, as determined by Nissen method (see Ref. 2, end of article).

TABLE VII—EFFECT of Adding Calcium Phytate to 5 Percent Acetic Acid Solutions Containing Lead and Copper

Date	Blank (Control)	100 PPM. Lead	50 PPM. Lead	10 PPM. Lead	20 PPM. Copper	10 PPM. Copper	5 PPM. Copper	100 PPM. Lead 10 PPM. Copper	10 PPM. Lead 5 PPM. Copper
6-18-49	Clear	ppt.	ppt.	clear	clear	clear	clear	ppt.	clear
6-24-49	Clear	ppt.	ppt.	ppt.	ppt.	ppt.	clear	ppt.	ppt.

TABLE IV—QUANTITATIVE RELATIONSHIPS of Calcium and Sodium Phytates in a High Iron and Copper Cider Vinegar Heated to 180 F. After Addition of Phytates

Date	Relationships	Control	Calcium Phytate			Sodium Phytate		
7-23-49	Grams of phytates added to 450 c.c. vinegar	0.0	0.0625	0.1250	0.1940	0.0625	0.1250	0.1940
7-23-49	Grams of 1st precipitate	....	0.0435	0.0684	0.0773	0.0403	0.0642	0.0612
7-30-49	Grams of 2nd precipitate	....	0.0363	0.0248	0.0356	0.0391	0.0317	0.0343
....	Grams of combined precipitates	....	0.0798	0.0932	0.1129	0.0794	0.0959	0.0955
....	Expected iron phytate at 22.5 ppm.	....	0.0382	0.0382	0.0382	0.0382	0.0382	0.0382
....	Expected copper phytate at 31.5 ppm. ½ Cu. + + ½ Cu. +	....	0.0551	0.0551	0.0551	0.0551	0.0551	0.0551
....	Total of expected iron+copper phytates	....	0.0933	0.0933	0.0933	0.0933	0.0933	0.0933
....	Wt. of combined residue as mixed phytates	....	0.0798	0.0932	0.1129	0.0794	0.0959	0.0955
8-24-49	Iron after treatment, ppm.	25.0	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
8-28-49	Copper after treatment, ppm.	35.0	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000



TWENTY-PLATE frame filter purifies lard. With new alkali-rendering and refining, further clarity is obtained by filtering after drying and bleaching. Resulting product's shelf-life is longer than that of steam-rendered lard.

Lard Comeback Promised By New Quality Process

Method calls for special alkali-rendering and refining, followed by bleaching and deodorizing. Consumer tests show superior product results

F. E. DEATHERAGE

Department of Agricultural Biochemistry and Institute of Nutrition & Food Technology, The Ohio State University

A new, top quality lard—one termed far better than the steam-rendered product, and promising to compete with other shortenings—has been developed at Ohio State University. Utilized is a new, semi-continuous alkali-rendering and refining process, which includes additional operations, such as special bleaching, refining and deodorizing.

When lard lost favor prior to World War II, the Kroger Co. became interested in finding a way to obtain better use of this item produced in its packing plant, which had a capacity of only 1,100 hogs a day. Accordingly, a project was established in 1940 through The Ohio State University Research Foundation and the Department of Agricultural Biochemistry to investigate the problem.

Outcome was the development of the new alkali rendering and refining process for producing a high-grade lard. A partial disclosure[1] was made and recently a patent[2] was granted. The process was made the property of The Ohio State University Research Foundation through assignment by the Kroger Co., that has now discontinued all its meat packing operations.

Lard's place in the American economy is rapidly re-approaching its status of ten years ago, when it was in surplus and in disfavor with the housewife and food processor. This staple product had lost its place as the standard domestic and commercial shortening. Hence, losses were sustained by the packer and the swine producer.

Where Lard Stands

The packer was, and is again, encountering formidable competition. He must pay more for the pig than he can get for the lard. For a product constituting 16 to 18 percent of the live weight of the pig, he is faced with the question of deciding which method of disposal will yield the least loss.

Today, progress is being made on this problem by both the farmer and packer.

The farmer is trying to raise a leaner and meatier hog—which is not as simple as one might suppose. And in the packing industry, interest in improved methods of rendering is indicated in the disclosures of Jesperson's Danish process[3] and the Hormel process[4]. Development of bland lards and animal-fat shortenings for domestic and commercial users foreshadows keen

Alkali Requirements Vary for Different Fats

TABLE—QUANTITIES of Alkali Solution, Bowl Residue, and Fat Yield for Various Tissues That Were Alkali-Rendered In Typical Lab Run

Kind of Fat	Amount of NaOH Solution in Percent of Raw Material	Total Undissolved Matter* in Percent of Raw Material	Yield* in Percent of Raw Material
Ham	45–50	0.20–0.70	73–80
Back	40–45	0.06–0.15	84–90
Leaf	25–30	0.20–0.50	73–89
Caul (beef)	35–45	0.10–0.40	84–88

* It should be noted that small samples for laboratory rendering show more variation than larger scale plant operations.

competition for the producers of edible animal and vegetable fats.

About Initial Investigations

Before going into the process and product, let us review the initial studies that led to the development of the new process:

At the outset, Kroger made no limitations on the course of action to be followed. Its packing plant facilities and personnel and laboratories were made available to the investigator.

As a start, the company suggested the possibility of using lard as a base for spreads like margarine. Accordingly, the first job was to study the requirements of a lard that might be used in this manner. It was soon found that before U. S. No. 1 lard could be employed, bleaching, alkali refining and deodorization probably would be required. And it was also observed that more exhaustive deodorization might substitute for alkali refining (and this treatment is currently practiced). Furthermore, the lard would have to be fortified with antioxidants.

Two things were discovered: (1) Additional processing—beyond conventional steam rendering—would give a high over-all processing cost per pound of finished product, and (2) the lard would have general use as a shortening or base for other foods.

Conventional Rendering Unsatisfactory

Because of high processing costs and product losses with conventional rendering and caustic refining, studies were made to see if the rendering methods could be improved. Here, it was essential to determine the nature of pig fat *in situ*. In other words there was this question: Are the undesirable properties found in steam-rendered lard—odor, color, smoking and poor keeping quality—natural to pig fat, or are they imparted to the lard by the 6- to 12-hr. steam treatment used in prime steam rendering?

To find the answer, samples of fresh pig fat, such as back, ham and leaf, were extracted with freshly re-distilled ether. Others were extracted with freshly re-distilled acetone.

These solvent-extracted lards had free fatty acid contents of 0.10 to 0.15 percent, as contrasted with 0.3 to 0.5 percent, or more, for regular lards. Unlike the undesirable grays and gray-browns of prime steam-rendered lard, the color of unbleached solvent-extracted lards was a delicate light yellow. The odor was suggestive of lard, but less pronounced. And the keeping quality was about 50 to 100 percent greater than regular lard.

But the contrast between solvent-extracted and open-kettle rendered lards was even greater. When the products were prepared by grinding the tissue, gently heating it to 122.0 deg. F., and filtering off the fat, they were comparable to solvent-extracted samples. These tests indicated that the prime-steam or open-kettle rendering processes result in many of the undesirable properties in conventional lard.

Alkali Digestion the Answer

At first, laboratory and plant-scale experiments were carried out on rendering methods that would yield a product essentially like the natural pig fat *in situ*. These tests showed that the lower the processing time and temperature, the better the final product. And if the raw material were reduced to fat and liquid phases, the fat could be continuously separated by centrifuging.

To accomplish this, it would be necessary to dissolve the solid proteinaceous material in ham facings, back fat, and the like, in the water phase of the fat tissue by a relatively mild treatment. Of all the methods tried, liquefaction of the proteins by aqueous sodium hydroxide showed the most promise. In fact, such treatment was desirable, since the fat would have to be refined by the caustic method at the same time.

Extensive laboratory tests were undertaken to determine the conditions necessary for proper alkali digestion and effective separation of fat by centrifuging. For proper alkali digestion, it was necessary to set up conditions to prevent saponification of the fat. The answer was a 0.4 to 2.0 percent aqueous solution of sodium hydroxide and digesting at temperatures up to 212 deg. F. for approximately one hour. This treatment dissolves almost all of solid material, thus making a liquid biphasic mixture capable of separation with a centrifuge.

The separator used was a Sharples laboratory supercentrifuge, operating at 25,000 rpm. Its centrifugal force is comparable to that of the commercial No. 6 Sharples centrifuge.

After the initial separation, two or three hot water washes, followed by centrifugal separation, can be made. The final, washed, alkali rendered and refined lard closely resembled natural pig fat—without most of the undesirable properties found in conventionally rendered lard.

How Lab Tests Were Run

A typical laboratory run consisted of: (1) Mixing 6,275g. of skin-on back fat (ground through ¼-in. and ⅛-in. plates) with 40 percent of its weight of hot, 1.75 percent sodium hydroxide and a 3 percent salt solution, (2) heating the mixture in an open steam-jacketed kettle for one hour to a final temperature of 203 deg. F., (3) separating the hot mixture with a centrifugation using No. 9 ring dam, and (4) washing the fat with 20 percent of its weight of hot 5 percent salt solution and then twice with water —separating after each wash.

Yield: Lard, 5,402g.; total undissolved solids, 8g.

In the laboratory stage of the investigation, it was necessary to determine the amount of alkali needed to render all types of tissues going into lard and also the amount of solid matter likely to collect in the centrifuge bowl, thus necessitating knock down and cleaning.

The new process is subject to a number of variations. Alkali solutions can be varied in quantity and strength. Salt can be used in the digesting solution and/or wash to aid separation, but it is unnecessary. Acid washes may be employed, as well as partial acidulation of the digestion mixture prior to primary separation.

Pilot Plant Efforts

Alkali rendered lards produced in the laboratory were of excellent quality and plans were underway for the construction of a pilot plant. But about this time, the U. S. became involved in World War II. And it became apparent to Kroger that the construction of a pilot plant in its own packing plant would have to be delayed indefinitely. Since the company wished to be in position to adopt the process following cessation of hostilities, other methods of carrying on pilot plant-scale experiments were sought.

Although the alkali-rendering process was new, equipment needed to carry it out was already being used

in the food industries. Fortunately, facilities at other plants were made available. And it was therefore possible for us to carry out alkali-rendering experiments on 500-lb. lots of raw material. Cooperative efforts of several firms were pooled so that sufficient information could be gathered to formulate plans for the installation of a commercial unit.

Numerous experiments, patterned after the laboratory experiments, were carried out using 300 to 400 lb. of raw material. Commercial No. 6 Sharples centrifuge, equipped with a separator bowl and ring dam No. 35 or 36, was used. The data sought included centrifugation rates, amount of undissolved residue necessitating centrifuge knockdown, style of pumps and digestion tanks, yields (or losses), and operating conditions.

Conducting Large Scale Tests

A typical large scale experiment was conducted in this manner: A lot of 300 lb. of back fat (ground through a ⅛-in. plate) was mixed with 120 lb. of hot, 1.75 percent sodium hydroxide solution. Next, the mixture was heated in a steam-jacketed kettle with gentle agitation. A temperature of 200 deg. F. was attained within 30 min. and maintained for an additional half hour. Following digestion, primary separation was made at a rate of 1,800 lb. of raw tissue per hour. Then the fat was washed with 60 lb. of hot, 5 percent brine and again with 60 lb. of hot water. The fat was separated after each of these washes at rates of 1,650 and 1,900 lb. per hr. respectively.

Total undissolved solids amounted to 0.42 lb. (0.14 percent of raw material) in the primary separation. This figure indicates that a primary centrifuge would have to be cleaned after 6,000 lb. of the raw material passed through it. However, by properly designing the equipment, the solids can be removed prior to separation, thus preventing undissolved solid matter from reaching the centrifuge.

The amount of fat recovered by this large-scale test was 253 lb., or 84.3 percent. Losses of neutral fat and phospholipids in aqueous liquors (digestion and wash) were 0.12 percent of the raw material. Loss of total fatty acid (ether soluble after acidulation of aqueous liquors) amounted to 0.32 percent of the raw material.

Twelve Important Findings

Numerous large-scale experiments were undertaken with commercial centrifuges to study some of the factors responsible for the success of the rendering process. Some of the more important findings follow:

1. Raw material should be as fresh as possible, preferably coming directly from slaughtering and cutting.

2. Material can be ground with comminuting or screw-type units.

3. Ground material should be treated with alkali soon after it is ground. And it should not be heated before it is added to the digesting solution, because heat-denatured protein does not readily dissolve in the alkali.

4. Digestion can be conducted in the presence or absence of salt. But salt does tend to aid centrifugation. Use of up to 5 percent salt, (preferably commercial grades containing a small amount of calcium and magnesium chlorides), may be effective in the first wash.

5. Usually, a second water wash is sufficient.

6. Use of procedures that promote saponification must be avoided. An example is the application of excessive temperatures. Hence, employment of waste or exhaust steam as a source of heat is an advantage.

7. The digestion period can be prolonged somewhat, if necessary.

8. Agitation of the digesting mixture need not be excessive, and centrifuging can be aided provided agitation is stopped about 5 to 10 min. prior to separation. This technic will remove solid matter and some of the aqueous liquor before they reach the centrifuge.

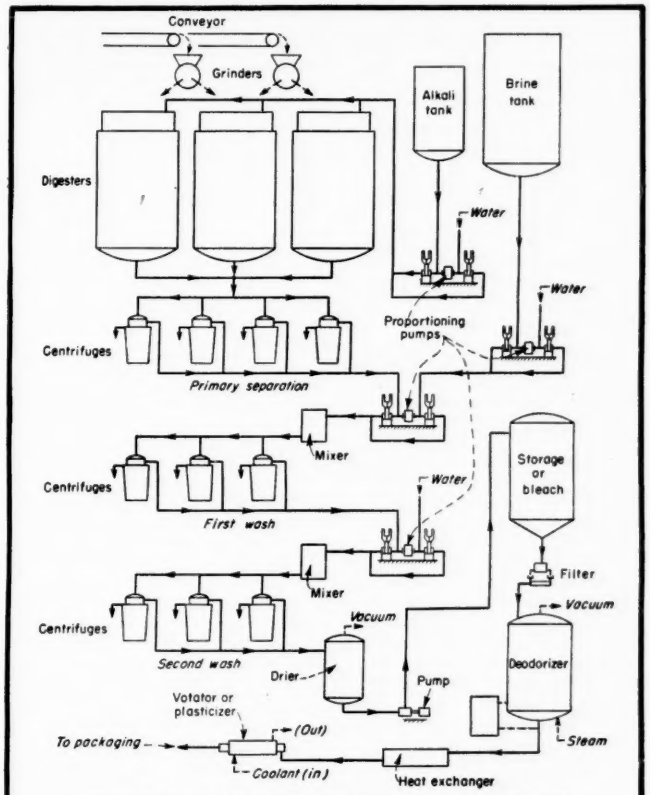
9. Centrifugal pumping must be avoided prior to the primary separation, and the digestion mixture should if possible, be gravity-fed to the primary separators.

10. Bones cannot be processed, but most fatty tissues going into rendered pork fat as well as those going into U. S. No. 1 lard, can be effectively handled.

11. Sweet-pickle fat gives a quality lard when alkali-rendered.

12. If alkali-rendered lard is used without deodorization, a final dilute acid wash, such as 0.5 percent phosphoric acid, improves flavor.

How Lard Is Alkali-Rendered and Refined



PREPARATION OF LARD BY ALKALI RENDERING AND REFINING PROCESS

Laboratory and large-scale experiments checked in almost every detail on processing, quality of product, and yield. The rendered material is immediately ready for the usual bleaching, hydrogenation, deodorization and plasticizing operations. All these operations have been carried out, except hydrogenation. Handling of alkali-rendered lard is identical to the procedure with other edible fats in these operations.

The new process is semi-continuous. Digestion is handled in a batch manner, while separation and washing are continuous. (However, there was some evidence that digestion might also be made continuous.) Processing—from raw material to rendered lard—takes 1¼ to 2 hr. But it appears that it would take 8 to 10 hr. to complete the entire process—from raw material to the finished, deodorized (batch), and packaged shortening.

When this project was undertaken, the process outlined in the diagram was drawn up for a Kroger plant killing 100 cattle and 1,100 hogs a day. Standard processing equipment required consisted of two grinders, three 1,200-gal. steam-jacketed kettles equipped with agitators, one 200-gal. supply tank for 20 percent sodium hydroxide, one 1,200-gal. supply tank for 20 percent salt solution, four primary centrifuges, six washing centrifuges, four proportioning and pumping devices, two mixing and heating chambers for the washes, and one vacuum dryer.

This equipment, of course, excluded filtering, deodorizing, plasticizing, and other supplementary apparatus used in the conventional method of processing bland shorteners.

About the Product

Alkali-rendered lard has a delicate yellow color (Lovibond: 2.0 yellow, 0.3 red) when melted, and white when plasticized. It has a mild uncooked odor. Its free fatty acid content is about 0.01 percent, and its smoke-point is 475-500 deg. F. This lard's keeping quality exceeds that of ordinary steam-rendered products by about 50 percent (incubation in air at 140 deg. F.). Alkali-rendered lard responds to antioxidants such as NDGA, the gallates, and tocopherols in a manner similar to most animal fats. It also retains the excellent plastic properties and chemical characteristics of lard.

Bleaching with charcoal or earth is unnecessary for alkali-rendered lards. If present, a small amount of chlorophyll may, if desired, be removed from the lard by using 0.01 percent or less, of Special Filtrol. Furthermore, some color may be removed by deodorization (to about 1.0 yellow, 0.3 red). Alkali-rendered beef fat is somewhat more yellow than lard processed from pork fat.

The flavor and odor of alkali-rendered lard are less pronounced than those of ordinary lard. And, for many purposes, the lard can be used without deodorization. However, for most purposes, deodorization is desirable, and it can be done more rapidly with alkali-rendered lard than many edible oils. In the laboratory, deodorization is complete in 1 to 2 hr. at 392 deg. F. and 0.01 mm. Pilot plant deodorization on 500-lb. lots at 392 deg. F. and 5 mm. was complete in 4 hr. No experiments were done for shorter periods. In either case, very little steam-distillable material appears.

There seems to be no troublesome flavor reversion in deodorized, alkali-rendered lards. Cans of 6-yr.-old alkali-rendered lards showed no appreciable flavor deterioration.

Consumer Acceptance Tests

In order to determine the quality of the product, consumer acceptance tests were made by Kroger's market research department. Samples for these tests were made on a pilot-plant scale. But since the sample preparation was divided among four firms in three cities in the course of a month, their quality was not as satisfactory as that attained from samples processed in a straight-line operation.

Leaf, back, and ham fats were alkali rendered, dried, filtered and deodorized. Next, these fats were blended to simulate a commercial lard, plasticized in a Votater, and packaged. Blends of undeodorized, alkali-rendered fats were similarly plasticized and packaged.

Comparative "blind" tests were made on consumers with the following significant findings: (1) Undeodorized, alkali-rendered lard was preferred to a commercial high grade steam-rendered lard; (2) deodorized, alkali-rendered lard was preferred to undeodorized, rendered lard; and (3) deodorized, alkali-rendered lard was comparable in acceptance to commercially available hydrogenated vegetable oil.

Because of Kroger's extensive baking operations, tests were conducted to determine the possibility of using alkali-rendered lard and beef fat in compounding commercial and domestic shortenings. Using these fats, it was possible to make an all-purpose shortening, doughnut frying fat, bread shortening, a biscuit and cracker shortening, and a high-ratio cake shortening—all comparable in quality to similar commercial products.

Use of deodorized, alkali-rendered lard as a margarine base showed some promise. And deodorized, alkali-rendered lard oil was satisfactorily used in salad dressings.

The by-product of the alkali-rendering process is like the stick obtained during steam rendering. But the method of utilization and treatment of the alkaline protein hydrolysate must depend upon the plant. If salt were not used in the digesting solution, the resulting hydrolysate could be neutralized and sent to the tank for incorporation into meat scrap, or it could be dried by itself.

The hydrolysate consists of an acid-precipitable fraction that is soluble in 70 percent ethanol and a proteose-peptone fraction. These fractions amount to 0.2-1.7 percent and 0.2-3.0 percent of the raw tissue. If the market warrants, these products could be separated.

During the investigation, some commercial interest was found in these materials. In addition to nitrogenous material, the acid-precipitable fraction contains some free fatty acid, mixed phosphatides and any neutral fat lost (usually insignificant in amount). It is easy to recover this fraction by acidulation and filtering. But the proteose-peptone fraction is somewhat more difficult to separate in pure form.

The most effective utilization of the hydrolysate has not been studied. It was felt that the alkali-rendering process had sufficient merit in producing a quality fat in greater yields than the regular method so that it would be unnecessary to depend upon nitrogenous waste to assure profitable use of the alkali-rendering process.

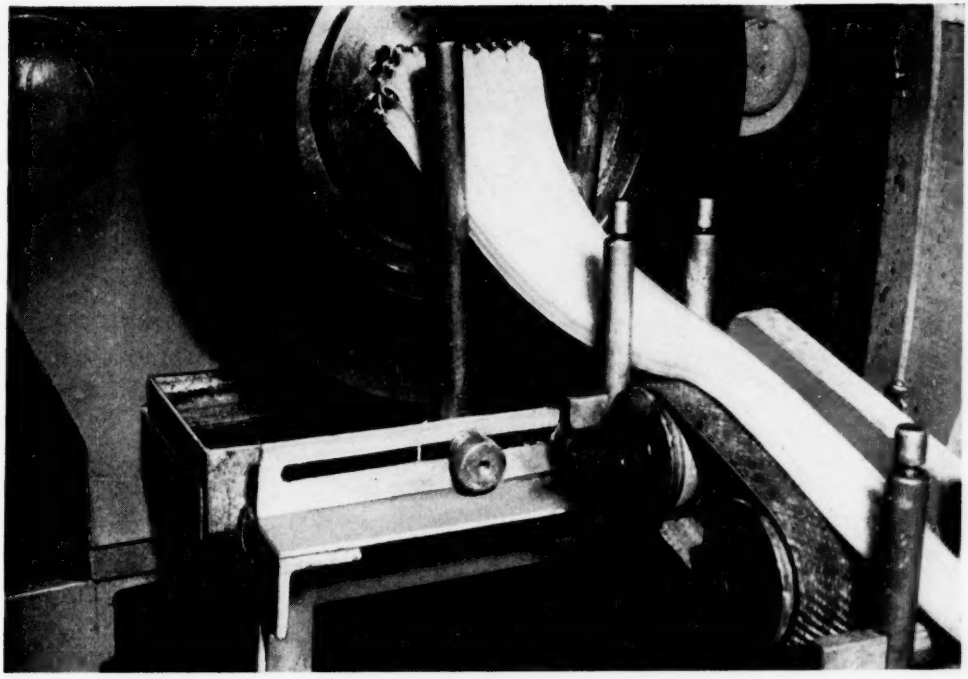
In Summary

The conventional lard was considered as the standard shortening up until 30 to 35 years ago. But today, bland shortenings and edible oils are desired by most commercial and domestic users. Furthermore, advances made in food technology and the chemistry and processing of fats and oils have resulted in "tailor-made" commercial shortenings. That animal fats may be used for bland "tailor-made" products is a challenge to the meat packers.

Two approaches to this challenge are being tried by producers of animal fat. One is to superimpose refining, bleaching, hydrogenation and deodorization operations and the addition of emulsifiers and antioxidants to conventional steam-rendered pork and beef fats. The other approach is to utilize new rendering technics designed to improve the fat.

These new methods either facilitate or eliminate some of these same operations. For the packer, the question appears to be which way is more efficient, gives greater yield, costs less, produces a product the consumer really wants, and yields the greater over-all profit.

(*Turn to page* 198)



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Doing It Better Is a *Habit* at Whitman's

And candy maker now continues century-long stride with newly efficient unit operations. Featured are special extruder and vacuum expander

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

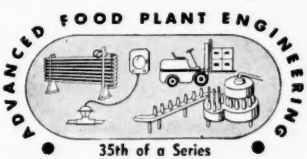
Making better and better candies for more than a century—and doing it with progressively higher efficiency—is a notable achievement. S. F. Whitman & Son of Philadelphia has been doing just that.

Behind this progress lies much more than the selection of quality ingredients, close control in processing, and careful inspection. Prominent are the advanced technics that have been applied in many different unit operations and processes—and it may be noted that they are of interest to the food processing industry as a whole. The equipment is not only more efficient but it also improves quality.

Backed with ample funds by management, the company's technologists have devised many of the better methods and processes. And much of the new and improved equipment has been designed by the firm's engineers and built in the company machine shop.

Whitman's advances have covered a wide range. Better technics have been introduced in the making of hard candy, the production and refining of chocolate and coatings, and in the forming, mixing, assembling, cooling, handling and packaging of various candies.

Careful study of the former hard candy operations revealed many unnecessary handling steps, each involving an appreciable amount of time and labor. And some operations proved open to quality-improvement measures. As a result of the preliminary study, methods were developed for: (1) Extruding soft pulled candy, (2) vacuum-cooling pillow-shaped mints, and (3) improving packaging of the assorted hard candies.

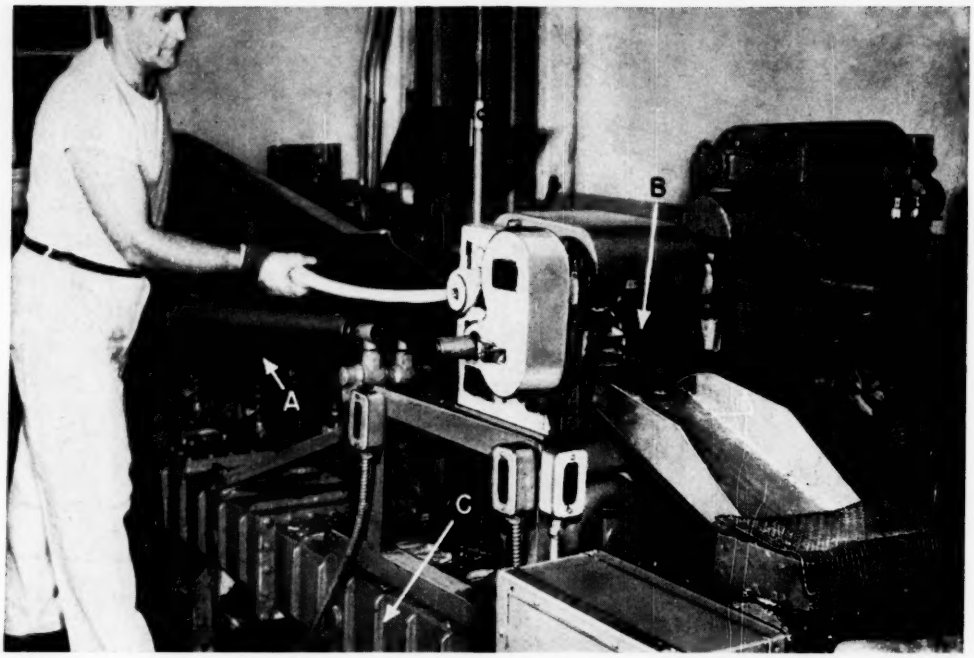


Extruder Forms a Better Candy

Invention of an extruding machine for forming a hard candy with stratified layers that entrap air to make the pieces "porous" was one notable achievement. Adoption of this machine was a radical departure from conventional honeycomb-candy make-ready operations. The extrusion assured more uniform control of size, texture and porosity of hard candies. Furthermore, this company-devised process turns out 50 percent more usable candy than the former method, and at a higher rate.

The trouble with the old method was the multiple handlings required—repeated pulling and folding of the batch—to give the candy its porosity.

A-B-C of Vacuum Expander That Doubles Size of Candy



VACUUM unit cools and expands pillow-shaped mints. Batch is formed into conical shape by tapered rollers (A), then fed into rotating cutter (B). Pieces drop into vacuum-cooling tunnel (C) and there expand over twice their original volume.

Besides, this excessive handling sealed some of the pores, imparting toughness. And it took two men about twice as long to pull and fold the candy as it now takes one man to extrude it.

How Candies Are Extruded

Up to the forming operation, the honeycomb candy is made in the same way as before. Sugar, corn syrup, molasses and salt are weighed into steam-jacketed copper kettles, where a 120-lb. batch is cooked to the proper temperature and then held under a high vacuum. After cooking, the candy is poured into three stainless steel pans, each holding 40 lb. Next, each small batch is dumped on top of a cast-iron table, leveled out with an iron bar, and cooled. Color and flavor are added at this point. Then, the candy is placed on a puller and aerated.

Formerly, the 40-lb. batch was formed into a hollow tube with a rolling pin. Men would then pull the tube and fold it in half, repeating this operation to give the candy its porosity. Next, the batch was carried to the tapered-roll spinning table and reduced to the proper width. Finally, the strip was automatically cut into pieces, which were then conveyed through a cooling tunnel.

With the extruder, the batch is loaded into a steam-jacketed cylinder. Then a hydraulic ram forces the candy through holes in a steel plate, the strands combining to form the "honeycomb" structure. The extruded strip of candy is reduced in size as it passes between vertical bars. Finally, the strips pass through an adjustable cutter, which chops them into 1-to 3-in. pieces that are conveyed through a cooler.

Development of the method for vacuum-cooling and expanding pillow-shaped mints resulted in an entirely new kind of hard candy. It is light and airy so that it actually melts in your mouth. And a pound of it has considerably greater volume than the same weight of regular pillow mints.

This candy contains sugar, corn syrup and invert sugar. After cooking, it is dumped from the kettle, cooled and machine-pulled, the flavor being added during this operation.

When shaping the candy after pulling, strips of red candy (previously prepared in small batches and hand-pulled into strips) are placed evenly over the piece, giving the mint its characteristic red and white stripes.

Now ready for cutting, the candy is loaded onto a spinner that has two gas-heated, corrugated, cast-iron rollers to form the confection into a conical shape. The smaller end of the resultant cone is fed into a machine where two revolving knives cut it into small pieces.

Vacuum Increases Size of Mints

These pieces drop into a vacuum-cooling tunnel. Traveling through on a 10-in. canvas belt, the candies are subjected to a vacuum, which expands them to more than twice their original volume.

At the end of the tunnel, the pieces are discharged onto an elevator that carries them to a conveyor going to the packing table. Finally, the pieces are filled into 6-oz. cans and sealed.

Novel Mixing Method

Better uniformity in the proportioning and mixing of assorted hard candies has been attained on the new packaging line. Another notable advantage is the reduction in the amount of handling required to mix the 17 different kinds of candies. There is now an ingenious use of belts, hence there is no longer the congestion that existed when the 17 varieties were stored in cans. Formerly, the assorted hard candies were mixed and packed this way:

Each of the 17 kinds of candy was collected in 50-lb. cans and stored on

the floor of the packaging room. Then, to make the assortment, about a third of the contents of each can was dumped into a 300-lb. bin, where the variety was mixed with a wooden paddle and finally hand-packed into glass jars.

As revamped, the operation is much more efficient. Now, a batch of hard candy—one of the 17 varieties—is conveyed directly from the cooling tunnel into a 60-lb. stainless-steel, wire-mesh hopper that travels over a 1,000-lb. stainless-steel bin. The hopper distributes the candy in an even layer over the bottom of the bin. And by repeating these two steps with the remaining 16 varieties, 17 different layers are built up in the bin.

Mixing is completed by conveyors as follows: A wire-mesh belt, forming the bottom of the collection bin, tumbles the candy out of the bin in a manner which simultaneously draws on all 17 layers. This mixture then drops onto a lateral conveyor, which later discharges it into another bin at the packing station.

High Capacity Cooler

Installation of multi-tier coolers has resulted in more uniform control over the quality of chocolates during cooling. And another thing: Production is twice that of conventional tunnel cooling—with two-thirds less floor space. The chocolates are cooled in ¾ hr., as they travel back and forth across twelve 50-ft. tiers in an air-conditioned room (temperature 60-63 deg. F.).

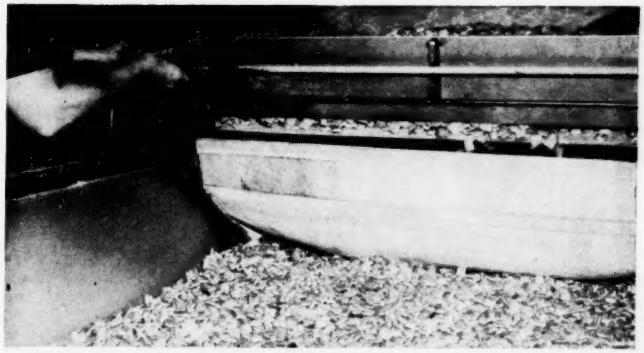
In the course of installing these coolers, two improvements were also made in delivering coating from tempering kettles to enrobers. The coating is now gravity-fed into enrobers, thus doing away with the difficult bucket feeding system. Pipes delivering coating to enrobers are insulated to assure a uniformly tempered chocolate.

Better Grinding and Refining

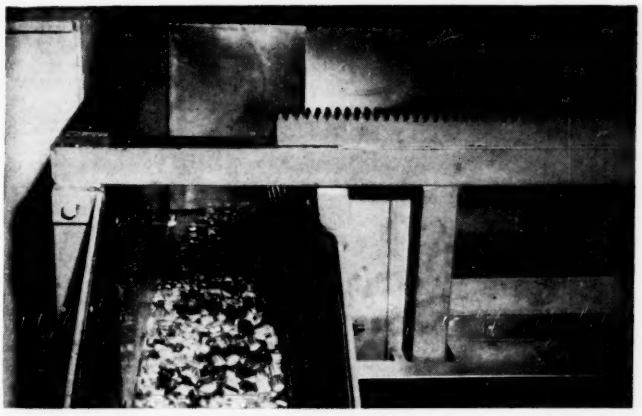
Finer reduction of the chocolate-liquor particle size has been attained with a new continuous Lehmann triple mill, improving chocolate quality. Furthermore, this mill has increased production and has reduced wear, and hence maintenance, on the three-roll liquor refiners.

In the new chocolate-liquor refining system, roasted cacao nibs are gravity-fed into a continuous pregrinder. Here, the nibs are pulverized as they pass between three vertical plates—a center plate revolving at 2,500 rpm. between two stationary plates. The production through this unit is 1,000 lb. per hour.

From the pregrinder coarse liquor is pumped to a continuous three-stage mill that reduces the size of the cacao particles so that 90 per cent of the liquor goes through 200-mesh screen.



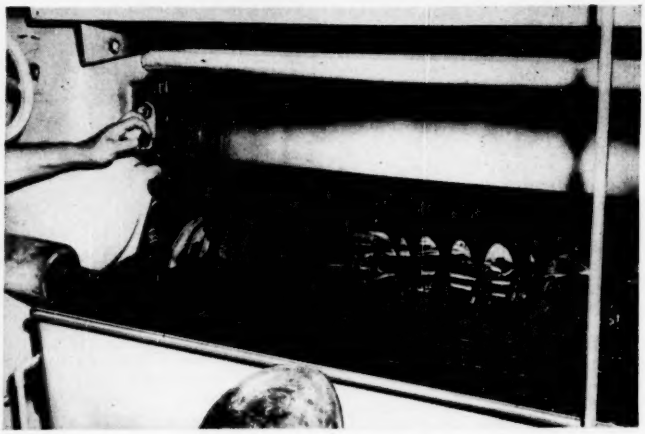
FIRST STEP in mixing hard candy assortment. Seventeen different candies are distributed by traveling hopper (top right) in even layers in 1,000-lb. collection bin (bottom). New method minimizes handling, while eliminating congestion caused by old bulk storage of cans on the floor of packing room.



SECOND STEP in mixing. Conveyor at the bottom of collection bin (right) tumbles candy from all 17 layers onto lateral conveyor (left). Candies are further mixed as this second belt dumps pieces into 1,000-lb. bin at packing station. Old way was to do all the mixing with paddles at this station.

FINAL STEP. Varieties intermingle as candies discharge from wire-mesh conveyor (top right) into packing bin (center). Girl fills glass jars and puts them on center conveyor. Second girl takes jars from belt, stands them on vibrator to obtain firm pack, and adds candy when needed. Later, jars are capped.

THREE-STAGE continuous mill was installed to get finer reduction of coarse chocolate liquor, thus producing improved coating chocolate.



THREE-ROLL chocolate liquor refiners continue the job. Liquor makes two passes through the first refiner. Then, liquor is pumped through two additional units. It is then fine enough to pass through 300-mesh screens, ready to be mixed with other ingredients and processed into chocolate coating.

Each stage consists of a pair of horizontally-set carborundum stones. The top stone revolves at 44 rpm., while the bottom one is stationary. Liquor enters through a hole at the axis of the top stone and is forced outward and to the periphery through grooves between the grinding surfaces of the stones.

This triple mill's stationary stones are equipped with steam coils which apply heat to them about an hour before operations are begun. With this arrangement, the mill is at the proper temperature when liquor is first run through it.

The steam coils reduce power requirements in setting the mill into operation, and the heat assures uniformity in the first run of liquor.

Liquor Is Further Refined

Upon leaving the triple mill, the liquor is pumped into storage. Employed here are a sufficient number of tanks to provide the required flexibility in the making of chocolate coatings. For example, liquor can be pumped from storage as needed to make milk, vanilla, or bitter chocolate coatings.

Next, the liquor is pumped into the hopper feeding the first of three 3-roll water-cooled refiners that are operated in series. In each the liquor passes between the first and second rolls, then between the second and third rolls. The latter two rolls are set progressively closer together.

Each succeeding roll rotates at higher speed and in the opposite direction than the preceding one. And rolls on the second and third refiners are set progressively closer together so that liquor leaving the third refiner will pass through a 300-mesh screen.

Most of the liquor leaving these refiners is pumped into storage, ready to be used for coatings.

Making the Coating

Today, the quality coatings are made in this manner:

Refined liquor and melted cocoa butter are flow-metered into a 5,000-lb. horizontal emulsifier. Sugar is chuted into the mixer from the floor above. And other ingredients are added directly into the unit.

Made of cast-steel, the emulsifier is hot water-jacketed and equipped with two sets of mixing paddles. One set of paddles is arranged so that it forms a continuous scraping spiral. And inside this set, another set of shorter paddles whips up the coating in the opposite direction.

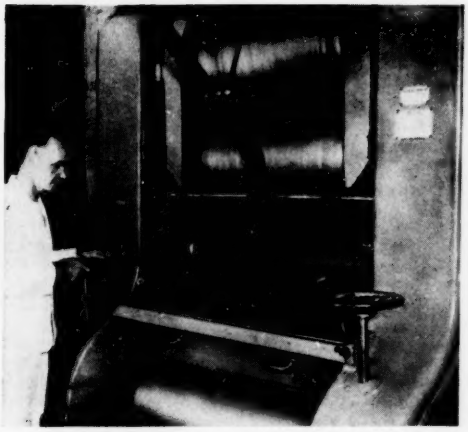
After the coating has been thoroughly mixed, it is transferred into another emulsifier that feeds it to a 5-roll refiner. This second emulsifier serves as a holding unit to permit continuous operation of the refining mill.

Operation of the 5-roll mill is similar

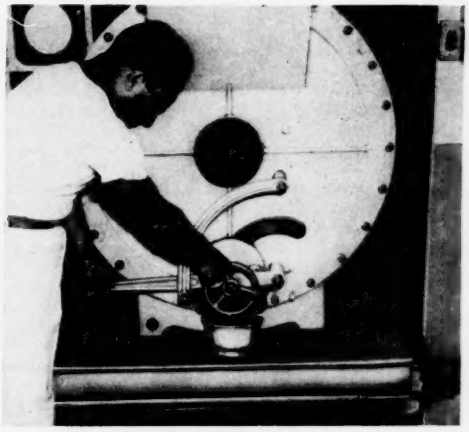
Old Packing: Takes girl months to learn

GIRL on tray-belt line packs six boxes at a time, picking chocolates from stock cases traveling along 100-ft. tray-type belt (right). It takes four to five months to train a packer. This line now serves as a labor-pool for the new chocolate-packing system, and it can be used to pack up to 8,000 boxes per shift.

Bring Better Chocolate Coatings



THIS FIVE-ROLL mill refines the coating chocolate. Rollers are like those on 3-roll liquor refiner. They are water-cooled, rotate at progressively higher speeds. Space between successive pairs of rolls is progressively smaller.



BRAMLEY MILL does final refining of the coating chocolate. This mill comprises a stationary corrugated cylinder with a rotating scraper. Grinding takes place as coating is whipped against the inside walls of cylinder.

to that of the 3-roll machine. The coating particles are progressively reduced in size as the coating passes between the horizontal, chilled-iron, water-cooled rollers under a pressure of 8 tons per square inch. A stationary knife scrapes the coating off the last roll, and the coating then goes into a third emulsifier. The capacity of the refiner is 700-plus lb. an hr.

From the third emulsifier, the chocolate goes to 1,000-lb. capacity Bramley horizontal refiners, where it is ground for only about half the time formerly required with the conventional chocolate process. Grinding takes place as a rotating scraper whips the coating against the surface of a corrugated cylinder. If the refiners ever carry too high a load, the motors shut off automatically.

Finally, the chocolate goes into 10,000-lb. storage tanks, ready for the tempering kettles in the enrobing department.

Highly Efficient Packaging

Efficiency in packaging assorted chocolates is attained through the use of conveyor lines of two types. One uses a tray-belt to carry the candy to the packers. The other employs a plain belt to convey the boxes past the packers.

There are two tray-belt lines and four plain-belt lines in the packaging department.

Most important single advantage of the tray-belt and plain-belt packaging lines for assorted chocolates is the great number of inspections the boxes of chocolates receive. This assures that nothing but a quality pack goes out of the plant. On the tray-belt line highly-trained girls inspect the candies as they are packed. Then there are two inspections near the end of the line.

On the plain-belt line, top and bottom layers are looked over by roaming inspectors. And the top layer is again inspected at the brushing station.

The tray-belt system has these additional advantages:

1. It is extremely flexible, since it can be used to pack as few as 300 or 400 boxes and as many as 7,000 or 8,000 lb. boxes per 8-hr. shift, using up to 40 packers.

2. This line serves as a labor-pool for the plain-belt line. This is possible because any number of girls can pack on the tray-belt line whereas requirements on the plain-belt line limit the number of workers. Thus, if a worker on the straight-line belt is absent, she can be replaced by a girl from the tray-belt.

Here is a step-by-step account of the tray-belt operations:

In front of the two lines are stationary, wooden, stock bins, each with 90 compartments holding two cases of stock. These stock cases are 12 x 16 in. and they hold about 12 lb. of chocolates.

New Packing: Takes girl only a week

ON NEW LINE, boxes are conveyed by 150-ft.-long plastic belt past packers who handle only one type of chocolate. This system does not require high skill. It takes only a week for a new girl to "keep up." The two lines subsequently go to weighing, brushing and wrapping stations.

Two men feed the stock into the bins from the rear. And two girls remove stock from the front of the bins and load them into trays, two cases of the same variety of chocolates to a tray.

In addition to stocking the bins, the two men collect empty cases at the stocking station. Here, the empties are stacked on the floor, later to be placed on a conveyor going to the cleaning department.

Cases of stock are numbered to facilitate identifying each variety of chocolates, making it unnecessary to write out the name of the variety. For example, the "2" indicates "chocolate coated mints."

After the girls have filled the trays, the packing operation starts. As the belt moves along, girls picking a chocolate out of a case with their right hand, place it in a paper cup held in their left hand and set the piece in the proper position in a candy box, on an inclined table in front of them. Each girl must pick out six pieces of one kind of chocolate per stock tray before it passes her.

It takes the conveyor 23 min. to make a complete cycle. And each girl is expected to pack six 2-lb. boxes of chocolates in this time.

Time is allowed to transfer six packed boxes onto the 16-in. inspection belt running over the tray-belt. And there is also time to restock the packing table with empty box bottoms from a stationary shelf above the inspection belt. To make these changes, the tray belt is set up to allow empty trays to go past the packers. Empty box bottoms—as in the case of the Fairhill box—are already set up with double X forms that divide the bottom layer into seven sections.

After the bottom layer is packed, a tray on the conveyor delivers wax paper liners to the girls. Another carries chipboard liners, and a third supplies cardboard forms—a center and two end forms for dividing the top layer into five sections.

At this point, girls pack the top layer. Then the boxes ride along the top belt to a station where four girls (two on each side of the belt) inspect the top layer. Imperfect pieces are replaced, and any flaws in the box are corrected.

Leaving the inspection station, boxes go to the weigher. Then, the conveyor makes a right-angle turn, carrying the boxes to four other girls for a further inspection. Using a soft bristle brush, these girls also "polish" the top layer of chocolates.

Subsequently, two girls pack Jordan almonds and a special chocolate topping piece into the boxes. Then three girls add the folded guarantee inserts and put the lids on. Another girl feeds the closed boxes into a machine that overwraps them with heat-sealable cellophane. Farther along the line, an automatic machine puts a price label on each box. Finally, a girl packs three boxes into a chipboard container. And the finished goods are now chuted to the floor below, where they are cased.

New System Has Many Advantages

Now, about the new line: One advantage of this line is the little time required to train girls. It takes only a week for a new girl to learn to keep up with the belt, for all she has to do is pack one variety of chocolate into the proper place, in each box. But on the tray-belt line, it takes four to five months for a girl to become proficient. She must know the position in the box of each piece of candy and of the liners and dividers. And she must keep up with the belt while she packs six boxes at a time.

To eliminate congestion, lines are stocked with cases of the candy at night. Each girl then has an 8-hr. supply. As cases are emptied, they are loaded onto a center belt that carries them to the cleaning department, from where they are later returned to the enrobing department for refilling with finished chocolates.

At the carton-feeding station on each line, two girls open chipboard cartons each containing three empty 1-lb. candy boxes. Next, they separate box tops from bottoms. Bottoms are fed onto a 6-in. wide and 150-ft. long plastic belt that is fitted with wooden pegs that space the bottoms as they go to the packers. Then, the box tops and chipboard cartons ride along a top belt to the lidders and carton packers.

On the new packing line, a girl codes each bottom. Girls then pack chocolates in their proper places in the box, each girl handling only one specific piece of chocolate that goes into one specific place.

After the bottom layer is packed, a girl inserts a waxed paper liner. Another puts in a cardboard liner. And three girls place cardboard boats over the liners. Then, girls pack the top layer.

Five inspectors look over the top and bottom layers during the packing operation. Imperfect pieces are replaced, and flaws in packing are corrected.

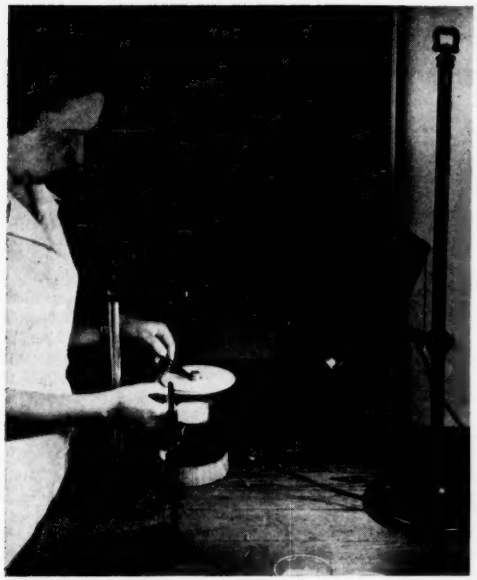
Near the end of the line, a girl weighs the boxes. Then girls inspect the boxes and the top layers of the confections are automatically brushed to a high luster by a specially designed machine.

The next two girls pack Jordan almonds and chocolate topping into the boxes. Another girl puts a top liner and insert in the box. Two girls put on the top lids. Another feeds boxes into the carton-wrapping machine. Price labels and ingredient stickers are applied to the boxes by machine. Finally, the last girl packs three boxes into a chipboard container and chutes it to the finished goods storage department on the floor below.

An important feature of the Whitman chocolate packaging department is the air conditioning. This prevents development on the chocolate coating of bloom, which may occur if the temperature is high enough for the cocoa butter to melt and come to the surface. It also keeps the coating firm enough to avoid fingermarking of the candy.

Finishing Touches

FINAL STEPS are the same on plain- and tray-belt lines. Boxes of chocolates (rolling in from right) are weighed, brushed, inspected and wrapped.



COLOR of treated, sliced apples is being measured with Maxwell disks, based on Munsell color system.

ASCORBIC ACID (vitamin C) content of frozen apples is being determined with the Coleman spectrophotometer.

Browning of Frozen Apples Prevented

Sodium bisulphite treatment rated best. All others, except sodium chloride, were acceptable. Ascorbic acid and SO_2 were well retained in fruit

KATHERINE G. KNIGHT and PAULINE C. PAUL

Department of Foods and Nutrition, Michigan State College, East Lansing, Mich.

Preserving the quality of sliced apples and keeping them like the fresh product can be achieved to a certain extent by freezing. But prefreezing treatment is necessary to prevent normal darkening.

Discoloration of the entire slice of apple takes place. And this condition makes it objectionable for use in the bakery trade. Darkening occurs not only during preparation, but continues slowly during freezing and 0 deg. F. storage.

How Some Chemicals React

To give the fruit correct prefreezing treatment, it is necessary to know how each variety responds to the different browning-prevention treatments. Senn and Bisno[1] believe that the sooner emphasis is placed upon definite standards acceptable to users, the greater will be the volume of frozen fruit sold.

A number of materials have been suggested to prevent discoloration in frozen apple slices. However, none has been universally adopted for one or more reasons. Sodium chloride will inactivate the oxidase enzyme system at low temperatures, but it will not bleach apples already discolored. Sulphurous acid, sodium bisulphite, and postassium metabisulphite can be used interchangeably to prevent fruits from browning. When in solution, these sulphur-containing compounds yield SO_2. Wiegand[2] reported that an SO_2 content of 50 to 100 ppm. in treated apples inhibited browning of the fresh and frozen fruit.

Ascorbic acid solutions prevent browning and loss of flavor in easily oxidized fruits. Sober[3] noted that a pH below 3.25 stabilized ascorbic acid and color in frozen fruits. Luther and Cragwell[4] reported that the addition of a suitable acid inactivated the enzymes involved in the destruction of natural and added ascorbic acid. But to be effective, these solutions must penetrate the fruit.

Apples Get Prefreezing Treatment

Jonathan apples, U. S. No. 1 grade, with a minimum diameter of $2\frac{1}{4}$ in., were used in this study. The apples had been in cold storage about two months before they were prepared for freezing. They were firm-ripe and well colored.

The fruit was peeled, trimmed and sliced into 12 pieces of equal size. A 1 percent sodium chloride solution was used to prevent browning while handling the fruit.

Apples were treated by the following methods before they were frozen:

1. *Control*—Samples were packaged and frozen: without additional treatment.

2. *Sodium chloride*—Treated samples were immersed in a 4 percent sodium chloride solution, under vacuum.

3. *Sulphur dioxide*—Treated sam-

Data Disclose Condition of Treated Apples

TABLE I—Of the Five Prefreezing Treatments Given to Sliced Apples, the Sodium Bisulphite One Came Out Best

Treatment	Weeks Held in Storage	Color	Consistency	Odor	Flavor	Tenderness of Fruit	Texture of Fruit	Crust Texture (lower)	General Conclusion
Fresh	0	5.7	5.6	5.8	5.4	5.7	5.5	4.1	5.3
None	2	3.7	5.1	4.6	4.2	4.8	5.0	4.2	4.4
	5	3.4	5.3	4.7	4.3	4.8	4.9	4.4	4.1
	10	3.8	5.4	4.8	4.7	5.0	5.0	4.9	4.5
	15	3.3	5.5	4.3	4.2	4.7	4.9	4.5	4.3
	20	3.4	5.1	4.8	4.0	4.2	4.7	4.5	3.9
	25	3.8	5.1	5.2	4.4	5.0	5.0	4.2	4.1
Sodium chloride	2	5.9	5.5	5.1	4.7	5.3	5.3	4.3	4.8
	5	5.4	4.8	5.3	3.9	4.7	4.7	4.5	4.0
	10	5.4	5.8	5.1	3.5	5.1	5.0	4.9	3.9
	15	5.6	5.9	5.4	3.2	4.6	4.7	4.8	3.9
	20	4.7	4.8	4.7	2.6	3.9	4.1	4.2	2.7
	25	4.6	4.1	4.5	2.7	3.8	4.1	4.3	3.0
Sodium bisulphite	2	5.0	5.5	4.9	4.9	5.3	5.3	4.2	4.9
	5	5.1	5.7	5.4	5.3	5.1	5.3	4.5	5.2
	10	5.1	5.7	5.1	4.7	5.1	5.1	4.6	4.9
	15	5.1	5.8	5.1	5.1	4.9	5.1	4.8	4.9
	20	4.3	5.4	4.5	4.3	4.7	4.7	4.5	4.1
	25	4.3	5.4	4.9	4.8	5.2	5.0	3.9	4.5
Sodium metabisulphite	2	5.8	5.3	5.4	5.1	5.1	5.1	4.3	5.0
	5	5.4	5.4	5.0	5.1	5.1	5.1	4.4	5.0
	10	4.8	5.0	4.9	4.5	4.7	4.6	4.8	4.4
	15	4.9	5.4	4.7	4.8	4.8	4.8	4.4	4.6
	20	4.8	5.5	4.8	4.5	4.5	4.6	4.4	4.2
	25	4.7	5.2	4.9	4.8	4.9	4.9	4.1	4.4
Ascorbic acid	2	5.9	3.8	5.2	5.1	5.5	5.2	3.5	4.7
	5	5.7	4.2	5.2	5.5	5.6	5.6	4.0	4.9
	10	5.2	3.8	5.1	5.3	5.5	5.6	3.9	4.8
	15	5.3	3.5	4.8	5.0	5.3	5.5	4.3	4.8
	20	4.8	3.0	5.2	4.9	5.2	5.2	4.2	4.5
	25	4.6	3.5	5.1	4.7	5.3	4.9	3.7	4.1
Ascorbic acid and citric acid	2	5.7	3.6	5.3	4.9	5.2	5.3	3.4	4.7
	5	5.5	4.0	5.5	5.3	5.6	5.8	4.1	5.0
	10	5.3	3.7	4.9	4.5	5.5	5.6	4.3	4.6
	15	5.4	3.9	4.9	4.9	5.5	5.7	4.6	4.9
	20	5.0	2.9	4.8	4.8	5.2	5.5	4.1	4.3
	25	4.8	3.2	5.1	4.4	5.4	5.2	3.8	4.1

TABLE II—Objective Color Data on Apple Slices From Baked Pies Show Sodium Bisulphite-Treated Apples Rated on a Par with Fresh Apples

Treatment	Weeks Held in Storage	Hue*	Value**	Chroma***
Fresh	0	20.58	7.02	9.36
None	2	17.59	4.94	5.58
	5	18.33	4.91	5.33
	10	19.61	5.49	5.21
	15	18.84	5.36	5.23
	20	18.56	5.16	4.32
	25	19.01	5.23	4.42
Sodium chloride	2	20.10	6.64	8.47
	5	18.89	5.88	7.66
	10	18.73	5.86	6.84
	15	19.77	6.03	6.50
	20	19.66	5.61	5.35
	25	20.07	5.79	5.42
Sodium bisulphite	2	20.57	6.63	8.21
	5	20.01	5.88	6.50
	10	19.60	5.85	6.00
	15	20.62	6.15	6.41
	20	20.44	5.86	5.16
	25	20.91	5.86	5.21
Potassium metabisulphite	2	23.36	7.12	8.35
	5	22.55	6.44	7.18
	10	22.29	6.44	6.53
	15	22.69	6.44	6.41
	20	22.68	6.26	5.69
	25	23.83	6.48	5.71
Ascorbic acid	2	22.51	6.98	8.33
	5	22.36	6.38	7.20
	10	21.82	6.37	6.58
	15	22.38	6.44	6.58
	20	21.81	6.11	5.74
	25	22.76	6.26	5.57
Ascorbic acid and citric acid	2	22.35	6.92	7.97
	5	21.01	6.24	7.22
	10	20.97	6.18	6.43
	15	21.83	6.24	6.10
	20	21.54	6.09	5.45
	25	21.59	6.03	5.28

* Hue of yellow-red is 15 and yellow is 25.
** Value runs from one (black) to ten (white).
*** Chroma is the strength of the color. The maximum chroma for yellow-red and yellow is 12.

TABLE III—Ascorbic Acid Content* of Treated and Untreated Raw, Frozen Apples

Weeks in Storage	Control Sample	Samples Treated With: Ascorbic Acid	Ascorbic Acid-Citric Acid
3	0.8	22.7	4.9
11	0.7	24.8	4.8
16	0.7	16.0	3.2
21	0.7	——	5.3
26	0.2	14.8	3.5

* Mg. per 100 g.

ples were submerged in 0.1 percent sodium bisulphite or 0.5 percent potassium metabisulphite solutions. Apple slices were immersed in one of the solutions for 2 min., drained, and then held in a covered, enameled container for 5 hr. to permit penetration of the solution before packaging.

4. *Ascorbic acid*—Treated samples were dipped in a 0.08 percent solution of l-ascorbic acid or a 0.5 percent solution containing 4 percent ascorbic acid and 96 percent citric acid, under vacuum.

After the apple slices were given prefreezing treatment, slices sufficient for one 9-in. pie were packed in waxed 1-qt. paperboard tubs with slip-in lids, using 4 parts of fruit and 1 part of sugar. The slices were frozen at —40 deg. F. and held at 0 deg. F. (± 2 deg. F.) until ready for testing.

How Tests Were Made

Tests were conducted with apple slices before they were frozen and after they were frozen and stored 2, 5, 10, 15, 20 and 25 weeks. Sample slices were baked into pies for subjective scoring and color measurements. Analyses were made of ascorbic acid and sulphur dioxide contents of raw (uncooked) samples.

Before making the pies, the frozen fruit was defrosted in a household refrigerator (41 deg. F.) for 14 to 15 hours. Sugar and spices were omitted. Paper pie plates with metal rims were lined with pastry. Apples were arranged on the bottom crust, and the upper crust was placed over the fruit. Next, the edges of the crust were turned under and crimped. Three slits were cut in the top crust to permit the escape of air and steam. Finally, the pies were baked at 400 deg. F. for 65 min. and cooled about 3½ hr. before the pies were scored.

A scoring panel was made up of six members. There were six test periods of five days each. And lots of frozen apple slices given the six prefreezing treatments were baked into pies each day.

Pies were presented to the judges at random, and they were scored for color, consistency, odor, flavor, tenderness of fruit, texture of fruit, texture of lower crust, general conclusion and acceptability. Scores ranged from: 1—very poor, 2—poor, 3—fair, 4—medium, 5—good, 6—very good and 7—excellent. Judges were requested to record any comments concerning outstanding features.

Color of the baked fruit was measured objectively with Maxwell disks, based on the Munsell color system. Calculations were made according to methods given by Nickerson[5]. Four disks were used. They were neutrals N1/ and N5/ or N8/ and hues 5Y

8/12 and 5YR 6/12. Results were expressed as hue, value and chroma. Hue is the name of a color—red, yellow, or blue. Value is the lightness or darkness of a color. And chroma is the strength or purity of a color.

Reduced ascorbic acid determinations were made on the frozen fruit by the method described by Loeffler and Ponting[6]. The SO_2 content of the frozen apple slices was determined according to the method of Ponting and Johnson[7].

What These Findings Revealed

1. Sodium bisulphite was best of the treatments used for the prevention of browning in frozen, sliced, Jonathan apples. All treatments tried, except sodium chloride, were acceptable. Prefreezing treatment was necessary to prevent browning.

2. Hue notations varied among treatments, but remained fairly constant during storage. Value and chroma scores declined during storage, indicating darkening and loss of color.

3. Retention of ascorbic acid and SO_2 in the frozen fruit was good.

Sodium Bisulphite Rated Best

Mean scores for the pies at each test period are shown in Table I.

Color: The fruit in control pies was dark brown and was scored the lowest. Apple slices treated with sodium chloride, ascorbic acid, and the ascorbic acid-citric acid combination were scored highest. Samples treated with sodium chloride had a pink cast; sodium bisulphite a brown tinge; and potassium metabisulphite a more yellow, bleached color. Color scores for fruit immersed in sodium chloride and ascorbic acid solution dropped the most during storage.

Consistency: Fruit dipped in ascorbic acid and ascorbic acid-citric acid solutions rated the lowest. There was an excessive amount of free juice in these pies. This high water content was attributed to the vacuum treatment. However, this juiciness might be corrected with a thickening agent. Untreated apples and those treated with sodium bisulphite and potassium metabisulphite were mushy and dry.

Odor: Judges did not comment on off-odors in the baked fruit. And they did not detect the odor of SO_2 in any of the samples. Differences in treatment had no effect on the odor of the fruit.

Flavor: Apple slices treated with ascorbic acid received the highest score. Fruit immersed in the ascorbic acid-citric acid solution was occasionally described as tart. Most judges frequently commented on the saltiness of slices treated with sodium chloride—the sample that dropped the most in the flavor score.

Tenderness of fruit: Samples treated with ascorbic acid and ascorbic acid-citric acid scored the highest. The sodium chloride-treated samples were the least tender. Judges described this fruit as dry, tough, and hard.

Texture of fruit: Apples dipped in ascorbic acid and ascorbic acid-citric acid solutions were the most desirable. Fruit treated with sodium chloride was coarse and disagreeable to the tongue. This coarseness may have been due to dehydration of fruit tissue by the salt.

Texture of lower crust: Scores for crust texture and consistency of the fruit followed the same pattern, an indication that the amount of liquid in the fruit had a direct influence on the texture of the lower crust.

Acceptability: Except for the control and sodium chloride-treated samples, all pies made from the frozen apple slices were acceptable. Control samples were unacceptable one day in the 5-week test period and one day in the 20-week period. Samples treated with sodium chloride were acceptable after two and five weeks' storage but became less acceptable each following test period.

In a nutshell, the scores showed that, on the average, apples treated with sodium bisulphite rated highest. Apples immersed in potassium metabisulphite, ascorbic acid and ascorbic acid-citric acid solutions were close seconds. Sodium chloride-treated apples scored the lowest.

What Color Tests Show

Notations from the objective color tests on the baked fruit are given in Table II. Fruit treated with sodium bisulphite had about the same hue as the fresh fruit, but the value was lower and not as much of the color was present. Apple slices immersed in a potassium metabisulphite solution were the yellowest, with slices treated with ascorbic acid being second, and those treated with ascorbic acid-citric acid rating third. Control samples had the least amount of yellow.

Figures for value show that control samples were darkest. Sodium metabisulphite, ascorbic acid and ascorbic acid-citric acid treated samples were lightest—all being nearly the same.

There was very little change in hue and value with the length of time in storage, but there was considerable change in chroma. The highest chroma was found in the fresh fruit. All of the frozen samples showed a decided decrease in chroma from the first time interval to the last. This shows there was a loss of color with storage.

Ascorbic Acid and SO_2 Retentions

Ascorbic acid determinations were made on the fruit treated with ascorbic acid and ascorbic acid-citric acid to measure vitamin C uptake and retention. The fruit receiving no treatment was used as a check. Data are shown in Table III.

Figures indicate very little reduced ascorbic acid in control samples. Ascorbic acid-treated apples contained about three and one half times as much ascorbic acid as those treated with ascorbic acid-citric acid. Ascorbic acid solution used for the prefreezing treatment contained four times as much ascorbic acid as the ascorbic acid-citric acid solution. The fluctuation in the figures for the treated fruit might be accounted for by variation in the amount of the solution absorbed by the fruit.

The SO_2 content of the fruit treated with sodium bisulphite and potassium metabisulphite was determined to find out how well SO_2 was retained in the fruit during storage.

Control samples contained no SO_2. Fruit treated with sodium bisulphite contained an average of 23 ppm. of SO_2 throughout the test period, compared to 108 ppm. of SO_2 in fruit treated with potassium metabisulphite. This difference in SO_2 content can be accounted for by the fact that the fruit was exposed to five times as much available SO_2 in the sample treated with potassium metabisulphite. From these figures it appears that the SO_2 was well retained during 0 deg. F. storage.

Findings Are Summarized

A study was made of five methods for preventing browning in frozen, sliced Jonathan apples used in pies. Fruit frozen without additional treatment after peeling and slicing was used as a control. Pies were made from the fresh fruit and from frozen apple slices after 2, 5, 10, 15, 20 and 25 weeks in 0 deg. F. storage. There were five replications in each test period.

Pies were scored subjectively for color, consistency, odor, flavor, tenderness of fruit, texture of fruit, texture of lower crust and general conclusion. The color was measured by the Munsell system, using a spinning-disk colorimeter. Raw fruit from the ap-

(*Turn to page* 196)

Speedy Unit Needs Only These 2 Girls to Carton Cakes

CAKES are pushed into cartons that have been automatically set up with front flaps open. Back flaps are closed.

Gets Bigger Output of Better

Baltimore bakery does it with special equipment that machine-opens and closes

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Cost of labor for packaging pies and layer cakes has been cut nearly two-thirds and production increased over one-half since the recent installation of an automatic cartoning unit at Rice's Bakery in Baltimore. This new machine handles 1,800 to 2,400 packages an hour. It was developed by the bakery in cooperation with an equipment manufacturer.

In addition to lowering costs and increasing productivity, this bakery greatly improved its packages. By adopting a special, rigid cellophane-window carton, it has given new consumer convenience and improved display value. And it has banished the old film-overwrap and consequently the troublesome sticking of icing.

The present laminated, moisture-proof carton was especially designed for easy opening and closing. To remove a pie or cake, the housewife merely pulls the top tear-flap and slides out the product. After a portion is consumed, the remainder may be replaced in the carton and the flap is tucked in.

Product visibility is attained with the new cellophane window, and there is now no need for an overwrap. Because the new window carton is rigid, icing does not contact, and stick to the cellophane.

Former Packaging Unsatisfactory

Before adopting the present method of packaging, the bakery went through two stages: First, these products were wrapped in cellophane by hand and then inserted into folding boxes to protect them during shipment and further handling. But this method had disadvantages: The cost of labor to package the goods was high, icing adhered to the cellophane, and the package afforded no product-visibility.

To get away from these objections, the bakery devised a second method: It packed pies and cakes into laminated, moistureproof cartons with windows and next machine-wrapped the cartons with heat-sealable cellophane. With this change, the packages gave visibility. Moreover, the amount of labor required to package the baked goods by this method was materially reduced.

Yet, this method also had drawbacks. The package could not be re-used after the cellophane was broken. And the cost of the package was out of line, because of the additional packaging material—the overwrap.

With this latter method of packaging, eight girls handled 1,200 packages per hour on one line. Three girls set up the cartons. Another three packed the product into them, closed the flaps, and placed the cartons on a canvas-belt conveyor. Finally, one girl fed them to a cellophane-wrapping machine and another loaded them onto racks.

By merely using the new cartoning machine and the special container, the

And Only This 1 Girl to Tend Labeling and Rack Boxes

AFTER FILLING and end-sealing, the labels go on (note rack of different type-plates) and boxes are then stacked.

Packages With Less Labor

improved, "non-stick" cartons, enabling reduction of crew from eight to three

aforesaid two-thirds reduction in labor costs and 50 percent up in production was effected. Instead of eight girls, the new way requires only three. Now one girl stocks the carton magazine and feeds pies or cakes from a rack onto the machine deadplate, where a second operator inserts them into cartons. Finally, a third girl loads the boxed goods onto racks.

Then—The New Way

But before the new method could be used satisfactorily, one important problem had to be solved. Briefly, something had to be done about the machine-jamming that was caused on occasions when the knocked-down cartons became bent. To overcome this, Marathon Corp., the manufacturer of the new cartons, ships each case of 200 cartons in layers of 50 with cardboard liners between the layers. This protective practice put a stop to the bending.

And now, here are the details on how the labor-saving machine works:

All operations are automatic, except for the insertion of the product into the cartons. Starting at one end with the stack of flat cartons, the machine automatically sets them up to receive the baked goods. Then, after the products are inserted, the cartons are automatically glued at both ends.

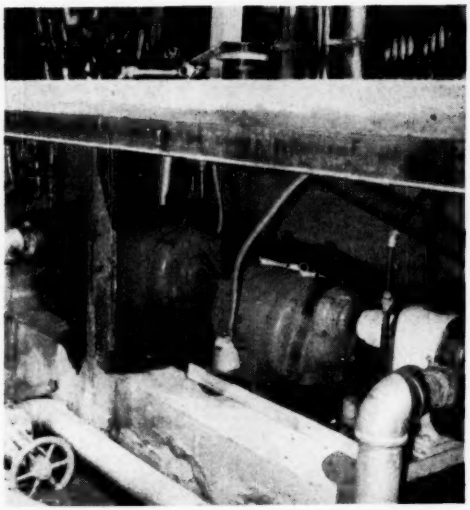
Filled cartons are then delivered to the machine's compression unit, where they are sealed. Finally, the cartons are conveyed to the other end, where another machine applies thermoplastic labels. These give the name of the product, its weight, and the price, also the ingredients used. Adjacent to the labeler is a box containing type-plates that can be selected for the different runs of products.

Two independent mechanisms comprise the automatic carton opener on the machine. These mechanisms, which consist of mechanical arms and a synchronized spring opener, assure proper setting up of the cartons. The arms break the folds and open the carton, while the spring opener assists the arms and serves to hold the carton open until the two small flaps on one end of the carton are automatically closed just before the product is inserted.

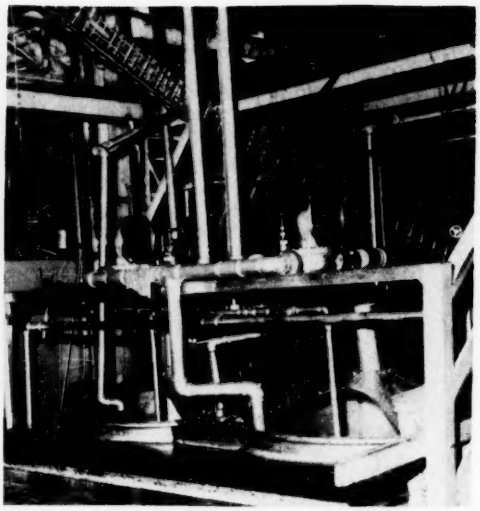
Thus, there is no possibility of the carton collapsing after it has been set up. The closed flaps also provide a firm stop for the product, which is inserted through the opposite end.

The cartoning unit, developed by Container Equipment Corp., can be quickly adjusted for three different sizes of cartons. There is one for cakes, which measures $4\frac{1}{2}$x$8\frac{1}{2}$x$8\frac{1}{2}$ in. and two for pies—the $1\frac{7}{8}$x8x8-in. size for fruit pies, and the $2\frac{1}{4}$x8x8 in. size for taller items like meringue, chiffon and Boston cream pies.

A future project of the bakery calls for further increasing production through the installation of two conveyors. One is planned for feeding the product from the cooling or icing stations to the automatic packaging machine, while the other will deliver the packaged goods to the shipping room.



ROTARY PLUNGER type pump (left) moves corn syrup, and sanitary pump (right) handles liquid sugar.



THESE AUTOMATIC proportioning meters measure syrups going into the mixing tanks through swing spout.

Liquid Ingredients Start Flow of Savings

Use of an economical corn syrup with liquid sugar enables canner to slash costs. Efficient pump system moves sweeteners, replacing expensive manual handling

RICHARD E. HEYL
Food Technologist, A. E. Staley Mfg. Co.

Dollar savings on ingredients and labor, and through increased production, have been effected by changing from the use of bagged sugar to a mixture of liquid sucrose and corn syrup as a sweetener in the cannery operations of Bercut-Richards Packing Co., Sacramento, Calif.

This switch from solid to liquid ingredients permits a notable new efficiency in materials handling. Semi-automatic pumping and blending equipment now handle the two liquids direct from the railroad tank cars to the mixing tanks.

Costs incurred in the use of the bagged, granulated sucrose as a sweetener for canned fruits had for a long time indicated a need for the mechanization of this sweetening phase of fruit canning. Besides the storage space and equipment needed, the labor cost for workers necessary for the handling and melting of dry sweeteners has steadily increased.

Following World War II, several large Western canners substituted liquid sugar for dry granulated by installing storage tanks, to which deliveries were made by tank trucks or cars. The resulting efficiencies and economies were of such magnitude that further research was instigated in the field of liquid sweeteners—to ascertain if even greater economies might be available.

After two years of investigation and tests, Bercut-Richards has installed, and successfully used during the recent fruit canning season, dual equipment for the mechanical handling of liquid sugar and an enzyme-converted corn syrup*.

Called "liquid corn" by the trade, this corn syrup has been used in a number of food products. It has been employed by Eastern canners since its development in 1939. However, the requirements of these plants were such that they had to secure their supply of liquid corn in drums, while a heavier requirement by the Western plants necessitated supply by tank car or tank trucks. And, because of the volume needed during fruit canning operations, it was necessary to mechanize the flow, blending, and cutting of these two syrups in order to assure an adequate supply.

* Sweetose, Reg. U. S. Pat. Off. made by A. E. Staley Mfg. Co., Decatur, Ill.

How It's Handled

The company here concerned has extensive railroad trackage adjacent to its plant. Here, five or more tank cars may be spotted and syrups drawn direct from them into process. Being leased by the syrup suppliers, no demurrage charges accrue on the tank cars during the short time they are kept standing on the company's sidings.

At canneries where spur railroad tracks are in nearly continuous use, it is recommended that a storage tank of about 25,000 gal. capacity be installed. Then liquid sweeteners can be unloaded immediately upon arrival so that plant sidings are not tied up and positive control of syrup viscosity can be maintained.

Prior to the 1949 canning season, a dual-unloading system for sweetener handling was installed. (See sketch). This system provides five flexible steel

hoses for connecting a combination of three tank cars of liquid sugar and two tank cars of liquid corn to the main unloading header. The syrups are kept separate until they are metered into the mixing tanks. Steam is used to heat the coils in the liquid corn tank car, reducing syrup viscosity and making pumping easier.

By a system of valves, any one or all five cars may be drawn from simultaneously. In case either of these syrups becomes unavailable by tank car, an emergency extension line under the railroad tracks to a road enables unloading from a tank truck.

From the discharge side of the two pumps, the syrups move through two 4-in., flanged galvanized pipes. To assure adequate flow and to compensate for unusually low temperatures that might occur during the canning season, the pipe carrying liquid corn is steam-traced so that it may be heated to lower syrup viscosity.

The syrups are pumped to two proportioning meters, where the full-time operator sets these automatic devices to deliver a predetermined amount of each to a single swing spout. As one of the two mixing tanks is filled, the swing spout is moved to the alternate tank and the pumping cycle repeated. The syrups in the first tank are mixed by steam agitation and diluted by the steam condensate to 60 deg. Brix. This blend is then pumped to the syrup cutting room for further dilution to the degree Brix required for the canning operation.

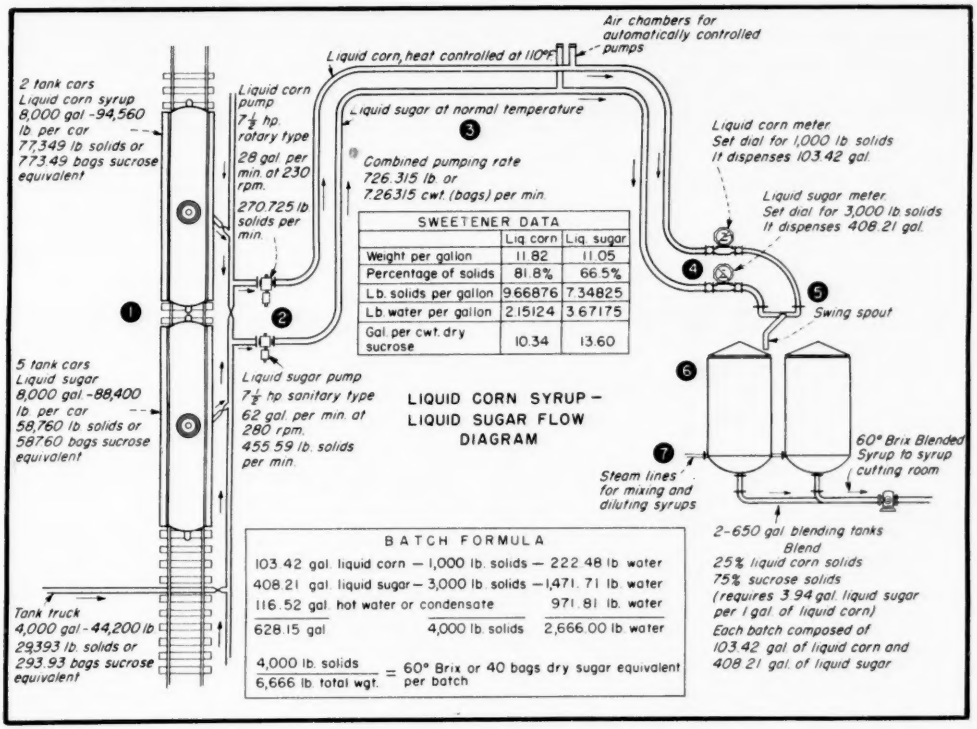
When this company used bagged, granulated sucrose, 27 min. were required for one cycle of dumping, melting, agitating, and pumping. But by using the dual liquid sweetener system, this cycle has been reduced to 9 min. for each 600 gal. mixed—a saving of 18 min. for each batch. On materials, savings of $1.30 a bag for all sucrose replaced by corn syrup were realized. Labor requirements have been reduced from a normal crew of at least five men and a peak-season crew of eight men to one full-time man to supervise all mixing at dump tanks and one part-time man to make tank car storage connections and arrange for movement of the tank cars.

Corn syrup is a broad term that covers numerous types of syrups derived from the hydrolysis of refined corn starch in the presence of water, hydrochloric acid, and heat. In general, there are four commercial classifications, which vary according to the dextrose equivalent (D.E.) or the total reducing sugar content calculated as dextrose on a dry basis. These commercial classifications are listed below:

Type of Corn Sirup	Approx. D. E.	Total Solids (43° Bé.)
1. Low conversion	28–33	79.5%
2. Medium conversion	40–42	80.3%
3. High-acid conversion	52–57	81.0%
4. High-enzyme conversion	62–65	81.8%

Low conversion corn syrup is not suitable for fruit canning because it lacks sweetness and has a high viscosity. Under some conditions, medium conversion corn syrup is satisfactory. High-acid conversion corn syrup is very satisfactory, but it is subject to development of a bitter flavor (hydrol) and possibility of crystallization of dextrose when the acid-conversion is carried too far. High-enzyme converted corn syrup has the greatest sweetness and the least viscosity (a

The Sequence


Air chambers for automatically controlled pumps
Liquid corn, heat controlled at 110°F
2 tank cars Liquid corn syrup 8,000 gal.-94,560 lb. per car 77,349 lb. solids or 773.49 bags sucrose equivalent
Liquid corn pump 7½ hp. rotary type 28 gal. per min. at 230 rpm. 270.725 lb. solids per min.
Liquid sugar at normal temperature
Combined pumping rate 726.315 lb. or 7.26315 cwt. (bags) per min.
Liquid corn meter. Set dial for 1,000 lb. solids It dispenses 103.42 gal.
Liquid sugar meter. Set dial for 3,000 lb. solids It dispenses 408.21 gal.
Swing spout
5 tank cars Liquid sugar 8,000 gal.-88,400 lb. per car 58,760 lb. solids or 587.60 bags sucrose equivalent
Liquid sugar pump 7½ hp. sanitary type 62 gal. per min. at 280 rpm. 455.59 lb. solids per min.
60° Brix Blended Syrup to syrup cutting room
Steam lines for mixing and diluting syrups
2-650 gal. blending tanks Blend 25% liquid corn solids 75% sucrose solids (requires 3.94 gal. liquid sugar per 1 gal. of liquid corn) Each batch composed of 103.42 gal. of liquid corn and 408.21 gal. of liquid sugar
Tank truck 4,000 gal.-44,200 lb. 29.393 lb. solids or 293.93 bags sucrose equivalent
LIQUID CORN SYRUP — LIQUID SUGAR FLOW DIAGRAM
SWEETENER DATA
BATCH FORMULA
103.42 gal. liquid corn — 1,000 lb. solids — 222.48 lb. water
408.21 gal. liquid sugar — 3,000 lb. solids — 1,471.71 lb. water
116.52 gal. hot water or condensate — 971.81 lb. water
628.15 gal — 4,000 lb. solids — 2,666.00 lb. water
4,000 lb. solids / 6,666 lb. total wgt. = 60° Brix or 40 bags dry sugar equivalent per batch

SWEETENER DATA	Liq. corn	Liq. sugar
Weight per gallon	11.82	11.05
Percentage of solids	81.8%	66.5%
Lb. solids per gallon	9.66876	7.34825
Lb. water per gallon	2.15124	3.67175
Gal. per cwt. dry sucrose	10.34	13.60

LIQUID corn syrup and sugar from railroad tank cars (1) are moved by the pumps (2) via pipelines (3) through automatic proportioning meters (4) and a swing spout (5) to mixing tanks (6). Here, steam (7) is employed to blend, and its condensate serves to reduce the heavy concentration of syrups.

factor in pumping). From a flavor standpoint, when blended with sucrose in the proportion of 25 percent (in accordance with Food & Drug standards), it produces an excellent syrup for packing all canned fruits.

Economics Cited

Cost of an installation for handling liquid corn will vary according to the amount of liquid sweetener required, the location of the plant, and the equipment necessary for storage and for moving syrups into process. Canners with a relatively high sugar usage will not only amortize the cost of an installation during the first year of operation, but will also show a substantial saving.

The savings may be grouped into three main categories: Ingredients, or cost of sweetening material; manpower; and miscellaneous, or inplant savings.

Ingredient Cost. During the 1949 fruit canning season, the costs of sweeteners at San Francisco were:

For refined sucrose, $7.90 cwt.; liquid sugar, $7.83 cwt.; corn syrup, $5.41 cwt.; and dextrose, $6.40 cwt.

The above sweetening-ingredient costs may be confusing to one not familiar with the total solids content of each sweetener, and the sales methods used by the cane and beet sugar manufacturers and the corn refiners.

Liquid corn is sold on f.o.b. plant basis, and the delivered price, which includes the freight, is the same at all points on the West Coast. Sucrose is sold on the basing point system, and has a freight charge beyond the basing point. Dextrose is sold at a flat differential under cane.

Provisions of the Federal standards for canned fruit must be considered in calculating sweetening ingredient cost. They permit ¼ liquid corn with ¾ sucrose, or 1/3 dextrose with 2/3 sucrose, all on a solids basis.

Manpower savings. These derive from the substitution of mechanical operation for manual labor. Our accompanying table shows a comparison of various systems of sweetener handling. A careful appraisal indicates that an average factor of 15c. will cover all elements of cost in handling a 100-lb. bag of sucrose or dextrose, and a cost factor of about ¾c. per cwt. of solids will account for power and all labor costs for handling the liquids.

These elements include unloading, movement to storage, storage rental, movement to process, unloading at process, cutting, dumping, spillage, melting, storing, empty bag accounting and disposal, and all labor incidental.

Miscellaneous. The table can be used by any canner having a plant near San Francisco to determine the savings to be expected, based on various combinations of sweetener usage. As an example, a canner with an annual requirement of 50,000 bags of granulated sucrose, located approximately 50 mi. from San Francisco, can refer to the comparisons in Section 3 of the table and determine the combined cost of sweeteners available to him. Reference to Section 6 will give approximate total costs, including handling, enabling him to estimate his expected savings.

The most economical combination listed is liquid corn and liquid sugar. The canner's potential savings are $545.40 for each 1,000 bags of sweetener solids required. His expected season savings would be 50 x $545.40, or $27,270.00. On the assumption that a reasonable estimate of the cost of a liquid corn and liquid sugar installation would be approximately $12,000, this canner's net savings for the first year of operation would be $27,270 minus $12,000, or $15,270. Thus, the cost of the installation would be amortized, and $15,270 saved the first year.

In addition to the method of handling liquid corn at the plant described above, some full-scale cannery operators this season used an entirely new automatic proportioning and blending apparatus that made it possible to blend liquid corn and liquid sugar at the storage tanks. The blend was then pumped through a single pipe line to the cutting room. The information obtained from these pioneer installations will be used in engineering designs for future sweetener system installations.

Any Concentration—Instantly

Moreover, automatic syrup cutting equipment has been developed which will enable the fruit canner to obtain instantly any degree of syrup concentration he desires. In the cannery of tomorrow, instead of the "dump tank" and the "cutting tanks" currently used, automatic gravity control equipment, located at each can filler, will blend liquid sweeteners and water to the desired grades.

Limitation of the supply of liquid corn will govern extent of usage. Since production of corn syrup is concentrated in the Midwest corn belt, western canners also have the problem of transportation, which is considerably more complex than for locally produced liquid sugar.

However, with adequate storage facilities at the cannery, and with a fair estimate of the canner's seasonal requirements, the corn processor will be able to deliver liquid corn promptly at the time specified.

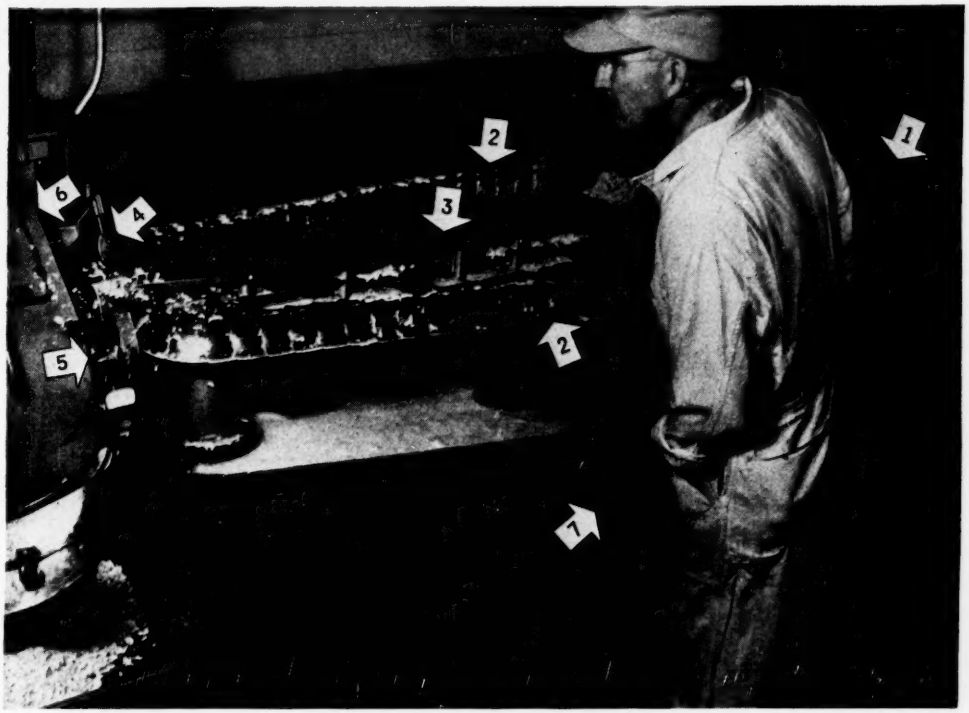
The Facts

TABLE—COST COMPARISON of Sweeteners for Canned Fruit (West Coast 1949 Packing Season)

Factors	Location: San Francisco	50-Mi. Radius	100-Mi. Radius
1. Price Per CWT. of Sweetener On Commercial Basis:			
Refined sucrose	$7.9000	$8.0100	$8.1650
Liquid sugar	7.8300	7.9400	8.0950
Liquid corn (81.8% T. S.*)	5.4100	5.4100	5.4100
Dextrose (92% T. S.*)	6.4000	6.5100	6.6650
2. Price Per CWT. of Sweetener Solids Delivered:			
Refined sucrose	7.9000	8.0100	8.1650
Liquid sugar	7.8300	7.9400	8.0950
Liquid corn	6.6073	6.6073	6.6073
Dextrose	6.9565	7.0739	7.2445
3. Cost Per CWT. of Sweetener Solids in Canning Syrups in Canner's Plant:			
Refined sucrose	7.9000	8.0100	8.3150
Liquid sugar	7.8300	7.9400	8.0950
25% liq. corn + 75% refined sucrose	7.5768	7.6593	7.7755
33 1/3% dextrose + 66 2/3% refined sucrose	7.5855	7.6979	7.8582
25% liq. corn + 75% liq. sugar	7.5243	7.6068	7.7251
33 1/3% dextrose + 66 2/3% liq. sugar	7.5388	7.7013	7.8115
4. Cost Per CWT., Including Handling Costs, of Sweetener Solids in Canning Syrups in Canner's Plant:**			
Refined sucrose	8.0500	8.1600	8.3150
Liquid sugar	7.8378	7.9478	8.1028
25% liq. corn + 75% refined sucrose	7.6913	7.7738	7.8900
33 1/3% dextrose + 66 2/3% refined sucrose	7.7355	7.8479	8.0081
25% liq. corn + 75% liq. sugar	7.5321	7.6146	7.7309
33 1/3% dextrose + 66 2/3% liq. sugar	7.5940	7.7065	7.8667
5. Total Cost, Including Handling Costs, of Sweeteners Per Per 1,000 CWT. (Bag) Units:**			
Refined sucrose	8,050.00	8,160.00	8,315.00
Liquid sugar	7,837.80	7,947.80	8,102.80
25% liq. corn + 75% refined sucrose	7,691.30	7,773.80	7,890.00
33 1/3% dextrose + 66 2/3% refined sucrose	7,735.50	7,847.90	8,008.10
25% liq. corn + 75% liq. sugar	7,532.10	7,614.60	7,730.90
33 1/3% dextrose + 66 2/3% liq. sugar	7,594.00	7,706.50	7,866.70
6. Comparison of Savings Per 1,000 CWT. (Bag) Units, With Handling Costs Figured In, Using:**			
Liq. sugar instead of ref. sugar	212.20	212.20	212.20
Liq. corn + ref. sucrose instead of ref. sucrose	358.70	386.20	425.00
Liq. corn + liq. sugar instead of ref. sucrose	517.90	545.40	584.10
Liq. corn + liq. sugar instead of dex. + ref. sucrose	203.40	233.30	277.20
Liq. corn + liq. sugar instead of dex. & liq. sugar	61.90	91.90	135.80
Liq. corn + liq. sugar instead of liq. sugar	305.70	333.20	371.90
Dextrose + ref. sucrose instead of ref. sucrose	314.50	312.10	306.90
Dextrose + liq. sugar instead of ref. sucrose	456.00	453.50	448.30
Dextrose + liq. sugar instead of liq. sugar	243.80	241.30	246.10

* Total solids.

** Handling costs of $0.15 per bag of dry sweetener, and of $0.0078 per cwt. of sweetener solids in liquid corn and liquid sugar.



HERE is the new automatic machine, with its component parts indicated by arrows. (1) Feed conveyor, (2) precision stainless steel molding chain, (3) chain-formed "tunnel" (under cover plate) where cylinder of tuna is shaped and fed forward, (4) knife which cuts and moves severed pieces into cans, (5) gooseneck down which filled cans roll, (6) enclosed unit in which are combined knife actuating and can-indexing mechanism, and (7) speed controller by which operator adjusts over-under weight of cut pieces. Unit fills either 7-oz. or ¼-lb. cans.

Machine Forms, Cuts, Puts Tuna In Cans

Eliminating hand-packing department, it fills as many cans in a minute as a skilled manual worker turned out in an hour

C. R. HAVIGHORST
Associate Editor, "Food Industries"

Slow and laborious work of hand-packing tuna in cans is eliminated by a new machine now in successful operation at The Columbia River Packers Assn., Astoria, Ore. Several other tuna canneries on the Pacific Coast have also adopted the equipment.

Known as the "Pak-Shaper", the device has been hailed as the most significant engineering advance in the tuna canning industry in years. In operation, the new machine automatically molds tuna loins into a cylindrical shape, then accurately cuts off pieces to correct weight and moves them into cans. The unit is constructed to fill either 7-oz. or ¼-lb. cans.

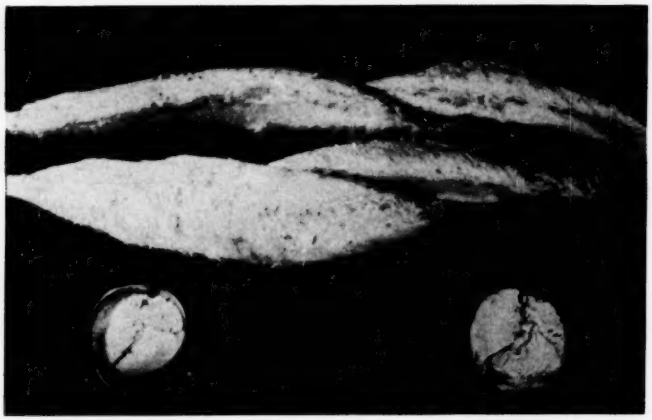
It does the work of about 50 hand-packers, accounting for savings of hundreds of dollars per day in operating costs.

Saves Tuna

What's more, its precision controls enable regulation of cut-weights within ⅛ oz. With such a precise weight tolerance, as compared to the common over- and under-weights in hand-packing, the savings in this expensive fish product are notable.

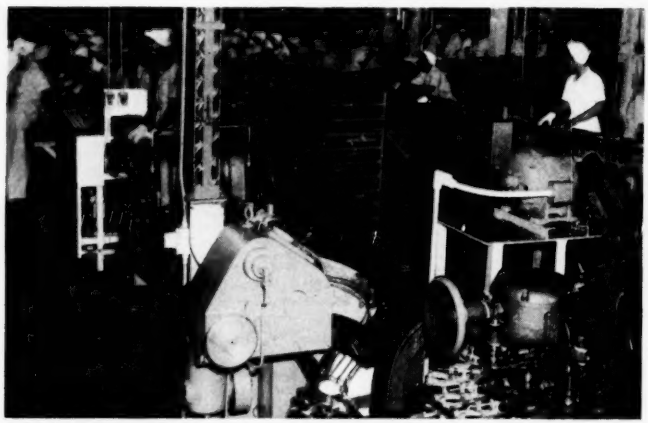
After tuna are precooked, workers remove the two loins from the sides of the fish and scrape them free of any adhering dark meat. With the exception of tuna livers and a small pack of combined white and dark meat, the recovery from the raw product is limited to the loins and represents about 45 percent of the weight of the raw fish. In view of this limited recovery of a high prieed raw product, extreme care is used to conserve all of these portions of the fish.

Formerly, tuna loins were first arranged on wooden trays, then moved,



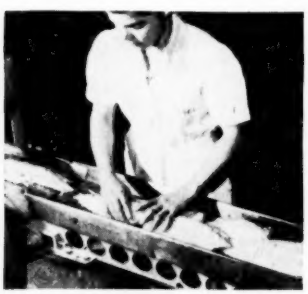
Whole Loins, Cut Section, and Canned Product

FOUR CLEANED loins (albacore), a section of tuna cylinder severed by knife, and a section as placed in a can. Loin size varies with tuna species.



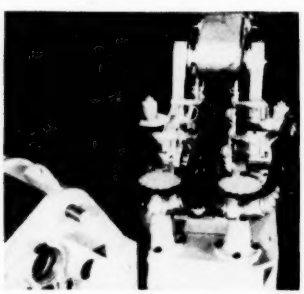
Three Lines In Action

WORKERS (background), on separate lines, clean and place tuna loins on conveyors leading to automatic cutting and packing machines (one is in foreground). At end of each preparation line, a single worker handles feeding of tuna loins into the automatic unit.



Feeding Closeup

HOW operator arranges tuna loins being conveyed into forming-chains.



Cleaning Features

FOR WASHING, filling unit swings aside and chain cover comes off.

by a conveyor, under an automatically operated knife, the "guillotine," which cut them into proper widths for packing into cans by hand. These trays then were conveyed to the hand-packers, each of whom filled from 120 to 130 cans per hour, depending on her skill and the sizes of the loins. These filled cans moved through the same finishing process as that which now follows packing with the new machine.

Elimination of the old wooden trays and the guillotine brings the cannery operator further savings—in maintenance and replacement and sanitation.

How It Works

The "Pak-Shaper," manufactured by E. H. Carruthers Co., Warrenton, Ore., needs only two operators and will pack up to 130 cans of tuna per minute, the equivalent of a skilled hand-packer's hourly total.

From the cleaning tables, the tuna loins move, by conveyor, to the operator who feeds the machine. This worker arranges the loins on a feeding conveyor in a manner most suitable for acceptance by the machine for forming the cylindrical section. Then the loins move automatically into the shaping chains.

These two endless-type stainless steel shaping chains, held by adjustable guides, are arranged in elliptical form on the machine, coming together to form a moving "tunnel" carrying the tuna loins. As the fish is moved toward the cutting knife, guides bearing on the chains apply pressure to form a solid cylinder of fish. The latter guides, which are adjustable, press alternately against the sides of the chains, thus facilitating the mechanical forming of the fish cylinder.

Weight Is Controlled

At the exit end of the chains, the cylinder is cut into the proper-weight widths by an automatically operated knife, which also ejects the severed piece into a can that has been positioned to accept it. The filled can then slides down a goose-neck and onto a conveyor, which carries it on for final processing.

Over- or under-weights can be easily and accurately corrected by the operator of the machine. He has only to turn an adjusting wheel which, through a variable control, makes a slight change in the speed of the forming-chains relative to speed of the knife and the can positioning mechanism. Usually this adjustment is made to compensate for factors such as a change in density of the fish or moisture content, which would result in inaccurate weights. In this instance, where an expensive fish is being handled, control of packing weights is of prime importance.

INTERCHANGE of views between plant man and retailer brought both goodwill and more effective selling.

Plant Men "Double" in Product Promotion

Taking to road in "off-season," they make goodwill calls at retail outlets—ironing out a lot of uncertainties on both sides

HOW to hold the nucleus of your production force through the "off-season" is an old problem in the food industry. And so is effective promotion of your food products. Seabrook Farms bound these two problems together last winter and came up with what looks very much like a solution to both.

Seabrook's season starts in late April, when asparagus begins to grow, and lasts fairly steadily over the summer and late into the fall with spinach and broccoli. Last year, its plant was just winding up its packing on December 15.

Production facilities at the Farms were expanded considerably during the war. Winter months were no more slack than the hot-and-heavy June pea season, since dehydration of root vegetables filled in the gap until the next crops of green vegetables were ready to harvest. Additional construction in the 1946-47 and 1947-48 winters gave employment to large numbers. But the pace was beginning to slow down, and prospects for 1948-49 indicated lean employment.

It was well along in the fall after other ideas had been thrashed out and discarded that C. F. Seabrook, the organization's president, came up with his plan.

"Send the plant men out on the road to make a goodwill tour of our retail outlets," Seabrook suggested. "Let them go out and tell about the farms and plant where our frozen foods are produced. And I have a hunch that seeing what happens to the product from the time it leaves their hands until it reaches the consumer will make better production men of them."

Short Promotion Course

Seizing on the plan, the Seabrook Farms sales staff undertook the development work, including a ten-day briefing course to familiarize the neophyte sales promotion men with the sales, advertising and merchandising programs. Distributors assisted in drawing up route maps similar to those used by their own salesmen. With 57 men available for this project, it was decided to detail the personnel in teams of ten, with a captain to supervise each. The five men selected as captains were sent on a test tour in Baltimore to gain information on reaction of the grocers to such a program. By the first week in January, the five teams were on the road.

The initial reaction can best be summed up by Tom Seracino, manager of a warehouse crew during production season and one of the team captains:

"The grocers I saw were extremely interested in knowing how frozen foods were grown and processed and asked a great many questions. All other men in my group had the same experience."

With the way prepared for the crews by spot radio announcements explaining the mission of the "Man From Seabrook Farms," the grocers' enthusiastic reception topped 95 percent. "The man" rolled up his sleeves, cleaned and scraped the freezer cabinets, and rearranged the merchandise. When he had completed this task, he offered to place point-of-sale advertising pieces, such as window streamers, price posters, decalcomanias, and the like, where they would aid in calling customer attention to the frozen foods. All the while, he answered questions about production, both from grocers

(*Turn to page* 198)

RESEARCH on prepackaged sweet corn was conducted in a mechanized plant operated right on a Florida farm.

USDA Looks at Food Marketing

Report reveals progress in food distribution studies. All aspects covered, from processing through packaging, transportation, warehousing and retailing

P. V. CARDON

Research Administrator, U. S. Department of Agriculture, Washington, D. C.

What has been done during the past year or so to help this country's privately operated marketing system to get farm products distributed to consumers in better condition and at less cost?

That question leads straight to one of the main objectives of the Research & Marketing Act. Federal funds, many of them matched 50-50 with state funds, are being used to do this job, so anyone has a right to ask for a progress report. I am glad to report on some representative results, with the hope that the fullest possible use will be made of them.

The following paragraphs discuss work completed or under way on prepackaging, grades and standards, better equipment, transportation, market expansion, and so forth.

Prepackaging is a relatively new, but already large and rapidly growing industry. So fast has been its growth that the industry has not been able to answer all the questions that have come up.

Results are in on one study of prepackaging and marketing of sweet corn in consumer-size packages. Experimental work was done on the Paul B. Dickman Farms at Ruskin, Fla., where 300 acres of Ioana, Golden Cross Bantam, and Golden Security corn were grown last year. In a plant operated right on the farm, the corn was husked mechanically, trimmed to 3- or 5-in. lengths, cooled to 45 deg. F. or colder, three large or five small pieces put in cardboard trays and wrapped with cellophane, then cooled again, and 800,000 such packages trucked to 200 cities east of the Mississippi.

Mechanical cooling units in trucks proved to be more satisfactory than ice bunkers because the mechanical equipment was able to maintain the necessary lower temperature on the road. Tests showed, however, that refrigeration before shipment was all-important, because the temperature of a truck load of prepackaged corn could be lowered very little while enroute with the types of equipment tried.

Higher Retail Profit

The marketing phase of the study in retail stores showed that there is more profit in handling prepackaged sweet corn than in the bulk product in the husk. The average final gross margin was 19.1 percent of sales value for prepackaged corn, 13.6 percent for bulk corn. Direct retail labor costs were about 3c. per sales dollar lower and spoilage losses about 10c. lower for the prepackaged than for the bulk. A survey of stores in New York, Baltimore, Washington, and Atlanta showed that retail sales per man-hour averaged about $102 for the prepackaged product, $16 for the bulk.

In some 50,000 of the 800,000 packages involved in this study, a postcard questionnaire was enclosed for the purpose of checking on general consumer reaction. Returns so far show that housewives are well pleased with the flavor, ease of preparation, visibility, lack of waste, cleanness, and convenience of prepackaged sweet corn. A more detailed report of this study is available from the Department's office of information.

Other Packaging Projects

Under another project, progress has been made toward improving the packaging of dry beans, peas, and rice. Shelf breakage, color deterioration, insect infestation, and mold caused by excessive moisture and heat are problems this study is trying to solve. One phase of this work has disclosed that there is a confusing variety of container sizes for dry beans, peas, and rice, particularly in the less-than-1 lb. packages. Housewives express dissatisfaction at buying what they assume to be 1 lb. packages of these commodities only to learn later that they contain somewhere between 12 and 15 oz. It would seem that the elimination of some of these intermediate-size packages would result in savings to packagers and less overhead and inventory investment for wholesalers and retailers. And it certainly would be a break for the household shopper.

Department scientists have discovered a chemical treatment that successfully keeps insects from getting into cotton bags. The process consists of impregnating the bags with a solution containing extremely small quantities of pyrethrins or mixtures of pyrethrins with piperonyl butoxide, which are unlikely to contaminate the contents. The specific purpose is to prevent insect damage to stored grains, cereal products, and seed stocks. Effectiveness of the treatment was tested by exposing treated and untreated bags full of insect-free flour in a heavily populated insect testing room. After seven months, no insects at all were found in the treated bags. There were 563 in the untreated bags.

Quality improvement is the goal of another RMA project in which Department entomologists are trying to discover how to prevent insects and insect debris from getting into processed fruits and vegetables. First efforts in this work are aimed at developing methods of removing the European corn borer from sweet corn at the cannery; removing aphids, caterpillars, etc., from broccoli, spinach, and other leafy vegetables; preventing contamination of canned peaches and tomatoes in Colorado by vinegar gnats; and, in the South, preventing contamination of canned black-eye peas by cowpea curculio.

Look to New Standards

There seems to be a general agreement that new and revised standards for grades should be worked out for processed fruits and vegetables. On the basis of data obtained so far in this broad field of work, the grades for green and wax beans, various citrus products, fruit jam and preserves, and cucumber pickles have been revised. Necessary information has been collected for establishing new or revised standards for grades of canned field peas, blackeye peas, white potatoes, maple sirup, canned asparagus, blueberries, okra, spinach, and certain items of frozen produce. Honey, canned plums, pineapple and pineapple juice, apple juice, grapejuice, and carrots are other items on which the necessary basic information is being obtained with a view to revising the grade standards.

Department researchers working in Arizona and California have designed a special pre-cooling tunnel that greatly reduces the time required to cool grapes before starting them on their way to distant markets. Recognizing that the quickest way to improve cooling was to expose the fruit to blasts of cold air, the tunnel is designed to permit such cooling as the unlidded lugs move slowly along to the lidding machine. Air is directed on the open-faced lugs at a velocity of 600 ft. per min.

Commercial coolers of two different types were tested in the specially designed tunnel, one of which had ammonia coils in the bunkers and maintained air blasts of 25 to 30 deg. F. Fans blow the cold air down on the grapes being moved through the tunnel.

The other cooler used ice instead of mechanical refrigeration. Here, the grapes are moved in four layers through the tunnel with propeller-type fans blowing the cold air around the top two layers. A baffle between the second and third layers divides the air stream into discharge and return, and thus prevents the air from by-passing the fruit. Air returning to the bunker cools the lugs on the lower two layers.

Speeds Cooling

With the use of this tunnel, 700 lugs can be cooled in a minimum of 2 hr., as compared with 14 to 18 hr. by other methods, which usually have entailed a full 24-hr. delay in getting a shipment under way. In a season of declining markets, such a delay might mean heavy losses to the shipper and less good fruit on the market.

Under an RMA project at the University of Georgia, engineers have adapted a machine for shelling peas and beans that will satisfactorily handle from 200 to 300 lb. of pods an hour. It is supposed to take an hour for one person to shell 10 lb. by hand.

At Orlando, Fla., more than 1,200 chemicals have been tested in an effort to reduce in-transit losses from stem-end rot of citrus fruit. Four have so far been found effective in cutting losses, but there must be further research to determine the effect of the chemicals on human health before specific recommendations can be made.

Poor Egg Handling

During and since the war, egg shipments by rail have been 10 to 20 percent heavier than prewar. The egg-trade men and shippers say that this heavier loading has been the cause of the tremendously increased damage to shell-egg shipments. Preliminary findings of an RMA study now indicate, however, that most of the damage is caused by lack of proper handling methods in loading the additional cases into the cars. A study along this same line, based on observations of 4,000 cars of peaches packed in baskets, showed that there was no significant difference in damage between loads packed three-layers high, (the usual method) and those packed four-layers high. Obviously, the four-layer load should mean a saving to the carrier, a substantial part of which might well go into reducing the producer-to-consumer price-spread for peaches.

The RMA for the first time authorizes the Department to contract with public or private agencies to carry out

research. Under this authority, contracts are in effect with the Railroad Perishable Inspection Agency and the Western Weighing & Inspection Bureau. Called for is collection of detailed loss and damage data on approximately 50,000 carloads of oranges, grapefruit, tomatoes, celery, cauliflower, lettuce, and dressed beef.

This information is being gathered in 86 primary and secondary markets. As soon as possible, it will be tabulated and classified according to the various types of containers used, shipping areas, methods of loading and bracing, and the type of equipment employed in transporting the produce to market.

Transportation rates for agricultural products have, in recent years, increased to a point where they add considerably to the cost of distribution. A study is being made of current freight-rate structures and services with the hope that the information obtained will provide a sound basis for determining whether or not further general freight rate increases are justified.

Study Freight Movement

A related study has to do with increasing efficiency in the use of transportation equipment. With the cooperation of several interested groups, complete records have been obtained on the movement of more than 23,000 carloads of freight. The figures show that nearly 20,000 of these 23,000 carloads were delayed somewhere along the line one day or more, the lags ranging from 1 to 34 days for individual cars.

This and other pertinent information has been presented to the Interstate Commerce Commission and the Association of American Railroads. It is expected that the facts will help to show inefficiences which, if corrected, could alleviate the shortage of transportation equipment and provide better service at reasonable rates.

Equipment Cuts Costs

Mechanized equipment has paid off well in the production of farm crops, but until recently little attention has been given to mechanizing the handling of them in marketing channels. The cost of these operations accounts for a large and increasing part of the total marketing bill for farm commodities. As a basis for recommending cost-reducing improvements, more than 1,300 time-study observations have been made in wholesale stores and warehouses in 36 cities throughout the country.

Results will show how many man-hours are required for unloading and placing in warehouses and stores various kinds of boxes, crates, cartons, etc., with various types of equipment. When findings are sufficiently conclusive, they will be made available to all handlers of farm products, and, there will be an effort to promote wide adoption of handling methods and equipment that will reduce costs.

How to expand markets for certain commodities is the objective of a rather large category of RMA work. Tree nuts was the subject of one such study, the results of which show that producers and processors of this commodity might meet less sales resistance if they would cater more to the needs of confectioners, bakers, and other industrial users of nuts. Some commercial packs, according to the survey, are below acceptable standards of confectioners and ice cream manufacturers. Confectioners say they would use more nuts if it were easier to get the kind they wanted. There is also a need, they say, for nuts that are more uniformly graded and sized. Ice cream makers are wary about buying tree nuts because they sometimes find shell fragments in them, some of the ice cream manufacturers limiting their purchases to nut meats packed in sanitary cartons lined with waxed paper. It is apparent from this survey that nut packers would increase and stabilize their market outlets if they put more stress on quality, size control, sanitation, and good packaging in their sales presentations.

If food processors and distributors are to do a bang-up job of marketing their products, they should have up-to-date information on family food habits, what the trends are, and the influence of income on food purchases. This is clearly evident from the recommendations of the producer-industry committees that have helped plan and set priorities as to what kind of work should be done first under the RMA.

Consumer Survey

A survey covering 1,600 households in 68 large and small cities throughout the country was made in the spring of 1948. Among other things, it shows that American families spent $25.57 a week, or 32 percent of their income, for food, as compared with $14.23, or 26 percent, in the spring of 1942, when a comparable survey was made. The bigger postwar food bills have gone partly into higher prices and partly into larger purchases.

Higher consumption of such things as milk, fruits, certain vegetables, eggs, meat, poultry, and fish indicate that the family's food money in 1948 bought better nutrition than in the early war years.

Family-Group Spending

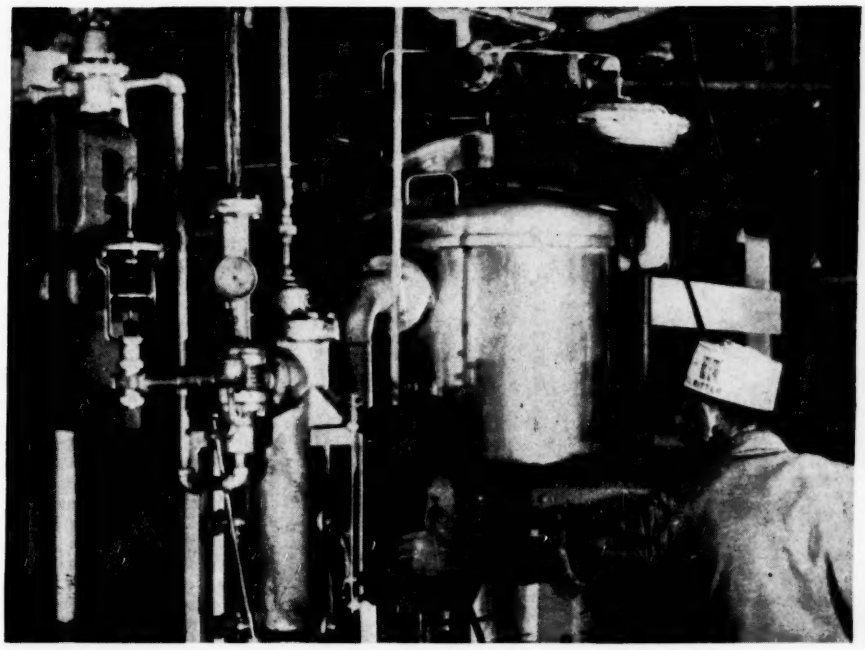
Here are some other pertinent facts: Families in the $7,500 or more a year group, which had the largest average family size, spent $44.08 a week, or 17 percent of their income, on food; those in the $3,000 to $4,000 group spent $27.06, or 35 percent; and those in the under-$1,000 group, where many were small families, spent $13.76, or 74 percent of their income, for food.

Families in the $7,500 or more bracket used ten times as much frozen fruit and vegetables as those with incomes under $2,000. Purchases of canned fruits and vegetables, soups, and the like, increased as income rose to $4,000, then leveled off or declined.

The examples given here briefly illustrate the wide range of work being done under RMA. Even this short report, however, evidences the serious attention we are giving to specific marketing problems — solutions of which will be of direct benefit to producers, processors and consumers of food products.

COST-CUTTING equipment and other improvements in warehousing form part of another study now being readied for publication.

A SPECIAL FOOD INDUSTRIES REPORT



OPERATION UNDERWAY. This deaeration unit removes entrapped air from tomato catsup. Procedure, seen here adopted in P. J. Ritter plant, Bridgeton, N. J., prevents discoloration and "neck-plug."

THE 'HOW' OF DEAERATION

When air is removed during food processing, much of the flavor, color, and vitamin content is retained—if the operation is done properly. Examined here are the proved methods of today, and assessed are the promising methods of tomorrow

HORACE L. SMITH, JR.
Consulting Engineer, Richmond, Va.

What is the most practical approach for the correct evaluation of the vital role of deaeration in the food industries? The answer to this question depends upon a number of influential factors.

Notably, we must first consider the product itself and its susceptibility to damage from oxidation. For example, entrained oxygen causes unsightly darkening of tomato catsup; it produces off-flavors in fruit and vegetable juices; it disturbs the CO_2 holding power of carbonated beverages, and it also destroys vitamin C and produces oxidized flavors in milk.

It is the purpose of this report to bring the reader up to date on the fundamentals and latest developments in deaeration.

Deaeration Defined

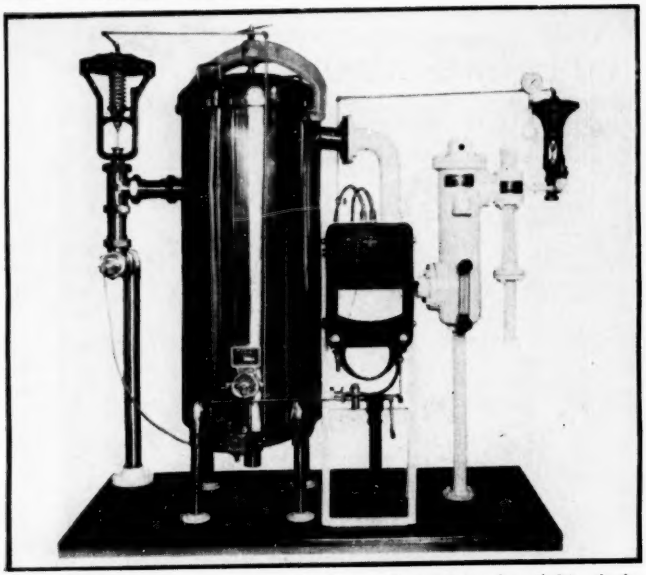
In removing oxygen from food products, especially liquids or semi-liquids, we use the general term, "deaeration." It will be defined as any process that removes air from a product—because, if air is removed, it is obvious that oxygen is likewise eliminated.

Some foods are more susceptible to oxidation than others, but as a general rule it is safe to state that all food products would be better—would suffer less change in taste and flavor—if they were maintained in an oxygen-free condition.

The following specific food products are greatly improved by deaeration: Citrus juices, such as orange, grapefruit, lime and lemon; tomato catsup and tomato juice; apple juice; honey; fresh market milk; strained baby foods; water for carbonated beverages; and vegetable oils.

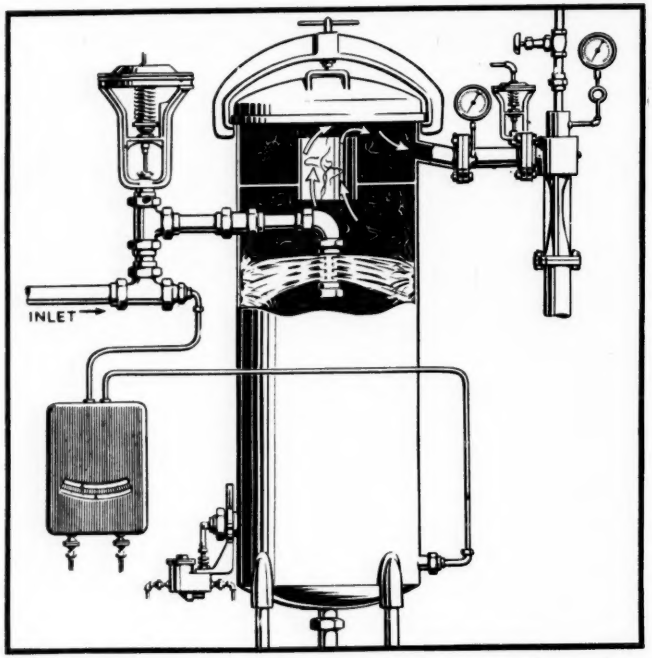
Probably tomato catsup represents the greatest volume of any food product that is deaerated. In its manufacture, standard procedure is to fill at

The outside and . . .



DEAERATOR for tomato catsup, showing product inlet valve (left), single stage steam-jet and condenser (right), vacuum control instrument (center).

. . . the inside



CUTAWAY of deaerator shell shows product entering as spray. Vapor and air rise (arrows) and are sucked to steam jet (right), product falls to bottom and is removed through sanitary line. (Chain Belt photo and drawing)

approximately 190 deg. F. If the bottle is closed by steam displacement, which is now practically standard procedure, a relatively high vacuum is created upon cooling.

Air bubbles that were in the catsup are subjected to this vacuum, and expand to many times their original size, thus creating a very unsightly appearance. Also, this air causes oxidation of the product in the neck of the bottle, producing a hard, dark, almost solid plug, and a definite darkening throughout the contents.

Natural Color Preserved

If properly deaerated just prior to filling, catsup retains the natural bright red color, no air bubbles are apparent throughout the mass, and oxidation in the neck of the bottle is eliminated.

With development of the high temperature pre-sterilization process for tomato juice, it is believed that deaeration before heating to the sterilization temperature will prevent excessive loss of ascorbic acid. Also, it will probably reduce the rate of film build-up on the heat exchanger surfaces. At the moment, however, no data are available to support this theory.

Canned apple juice is becoming a popular food product, and as apple products are very sensitive to oxidative changes, deaeration is definitely beneficial in processing this item. The air content is approximately 80 c.c. per gal. of juice before deaeration. If canned in this condition, the juice lacks apple aroma and flavor and develops a slightly astringent taste. These undesirable results are eliminated by proper deaeration.

An Aid to Carbonation

In the manufacture of carbonated beverages, elimination of dissolved air is desirable. Oxygen causes loss of flavor and aroma in some beverages, while in others oxidation of terpenes in the essential oils, produces an oily and bitter taste.

Because CO_2 is many times as soluble as air at room temperature, (the ratio being approximately 20 to 1), the result is that when a bottle of carbonated beverage is opened, thereby releasing the gas pressure, some of the dissolved air is thrown out of solution, and these minute bubbles or globules of air form nuclei for CO_2 bubbles. It has been estimated that, for each volume of air released from the solution, 7 to 10 volumes of CO_2 are carried out with it. Effect, of course, is that the beverage soon loses its carbonation and becomes flat, whereas if there is no air present, carbonation is retained for much longer periods.

It has been suggested that antioxidant materials be added, but this

does not correct all the trouble, in fact is not as satisfactory as deaeration.

Carbon dioxide has what is known as a polymeric characteristic in that, when absorbed by water, it enters into a loose chemical combination, H_2CO_3. In the supersaturated condition, CO_2 is released slowly, causing the prolonged effervescence of some carbonated beverages. Some beverages, depending on conditions, are capable of holding the gas better than others. Certain minerals or colloids, like the proteins in beer, increase their holding-on power, or stability of carbonation, whereas the distribution of fine particles throughout the liquid creates nuclei for the formation of smaller bubbles of CO_2 coming out of solution.

It is generally known that shaking or agitation disturbs the holding power of the liquid, and the CO_2 is liberated much more readily, with violent effervescence or foaming. The agitation need not necessarily be mechanical, since the equivalent of agitation can be caused by small bubbles of air coming out of solution upon decrease of pressure.

Due to the simplicity of the process, its insignificant cost, and the many other benefits derived from it, deaeration of water prior to carbonation should more than compensate for the cost.

Oxidized Flavor In Milk

Fresh market milk is consumed in such prodigious quantities that it is difficult to grasp the significance of the figures. Yet one of the common causes of complaint from the consuming public is oxidized flavor. Milk does not have a pronounced flavor, for which reason the development of any objectionable or off-flavors is readily detected. Work done by Sharp, Hand and Guthrie at Cornell University has proved conclusively that dissolved oxygen is the agent responsible for the development of the oxidized flavor in milk, and is also the cause of the disappearance of vitamin C.

Oxidized flavors do not develop in milk that is oxygen free, and vitamin C is stable in oxygen free milk. Oxidized flavor can be retarded by adding various chemical substances to milk, but these do not necessarily preserve vitamin C. Deaeration prevents development of oxidized flavor, preserves vitamin C, and does not involve the addition of foreign substances to the milk.

Milk has never been accepted as a source of vitamin C of nutritional significance. And yet, of 1,187 samples of fresh milk tested, the average ascorbic acid content was 22.2 mg. per liter, and 65 percent of the samples fell in a range of 18 to 26 mg.

In a test on 1,502 samples of three day old pasteurized market milk, 53.8 percent showed from 0 to 2 mg. ascorbic acid per liter, and the average of all the samples was 2.9 mg. From this it can be seen that the amount of ascorbic acid in bottled fresh market milk, as it is processed today, is of no nutritional significance. But, if the amount of vitamin C originally present could be preserved, milk would be a more valuable source of this vitamin than orange juice. For there is more vitamin C in the milk produced in this country than in the entire citrus crop.

High Quality vs. Off-Flavor

Oxidation of material associated with the fat globules produces off-flavors. In winter time, in pasteurized market milk of high quality, oxidized flavors have been found in as high as 80 percent of the milk tested. Oxidized flavor is more pronounced in milk of high quality, due to the low bacteria count. As the trend in every food industry is toward better sanitation and cleaner operating conditions, the oxidized-flavor defects can be expected to increase.

Dissolved copper is a very active catalyst in accelerating the development of the oxidized flavor, although this flavor will develop in winter milk of high sanitary quality, even in the complete absence of copper contamination, if oxygen is present.

Other Causes

Flavor defects in milk can also be caused by photo-chemical oxidation of ascorbic acid due to the catalytic action of lacto-flavin. Lacto-flavin is the constituent in milk responsible for the sensitivity of ascorbic acid to light. It has been conclusively demonstrated that if oxygen is removed from the milk, lacto-flavin does not act as a catalyst in the development of off-flavors.

Oxygen Present in All Foods

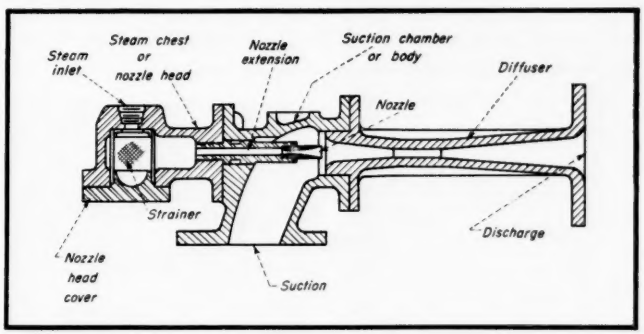
Practically all liquid and semi-liquid food products contain a high percentage of water, and water is a solvent for air. Due to exposure under conditions favorable for absorption of air, practically all food products contain oxygen to some degree. The amount dissolved depends on the product's composition, the amount of exposed surface in contact with air, the temperature of the product, and the length of time it is exposed to conditions favorable for dissolving air. Solubility decreases as temperature increases, and varies directly with the partial pressure of the gas.

It is well understood that gas is diffused from one medium to another, from liquids to vapors or other gases, and from vapors or other gases to liquids, depending upon the concentration and solubility of the gases in question and the different solvents. It is similarly well understood that, in order to cause the movement of a dissolved gas from one medium to the other, it is necessary to produce a partial pressure gradient between them.

Raising the temperature of water to the boiling point corresponding to the existing pressure, reduces the solubility of gases in the water to zero. But, this does not of itself eliminate molecules and bubbles of gas in the mass of the liquid. Unless they are separated, they will enter into solution again as soon as the temperature is reduced and the pressure increased.

In order to escape, the gas molecules must diffuse through the surface film

Working Principles of Gas Evacuator



STEAM-JET EJECTOR for removing condensible and non-condensible gases. High-pressure motive steam enters nozzle-head through strainer, expands through nozzle, and leaves at high velocity. Air, gas, vapor, or a mixture, goes into suction chamber and is entrained by steam. This combination enters venturi-shaped diffuser. Here, velocity-head—reconverted to pressure higher than that in suction area—discharges to atmosphere or into an after-condenser.

surrounding the particle of liquid. Rate of diffusion is proportionate to the concentration of gas within the liquid particle, to the surface area, and to the time of exposure. Diffusion is, therefore, much more rapid from small particles, or very thin films, or a combination of both, than from appreciable masses of still liquid.

There are several practical methods of eliminating dissolved gases from liquids, and to say that one is better than another without specifying the precise conditions would be a misstatement.

Boiling and Stripping

The two simplest and the most practical methods appear to be:

1. Boiling under reduced pressure conditions that expose the product in very finely divided form or in thin films.

2. Stripping by bubbling another gas through the liquid.

In deaerating by boiling under reduced pressure, the apparatus usually consists of a stainless steel shell, or tank, in which the material is sprayed in finely divided form or caused to flow in thin films exposing a large surface area. Vacuum is maintained in the chamber, the degree being such that flash boiling takes place and the temperature of the product is reduced several degrees, usually from 5 to 10 deg. F.

The term, "boiling" does not necessarily denote high temperature, since the temperature at which water boils is a function of the vapor pressure over the water. At sea level, water boils at 212 F. if the vapor pressure is 29.92 in. mercury absolute. For convenience in calculations, barometric pressure is usually accepted as 30 in. Hg. In referring to vapor pressure, especially in the subatmospheric range, it is less confusing to use the term absolute pressure rather than the more generally accepted term, "vacuum."

Barometric pressure is the level of the atmospheric pressure above perfect vacuum. Standard atmospheric pressure is 14.695 psi. or 760 mm. Hg, or 29.92 in. Hg absolute. Gage pressure is measured above atmospheric pressure, while absolute pressure always refers to perfect vacuum as a base. Vacuum, usually expressed in inches or millimeters of Hg, is the depression of pressure below the atmospheric level. An example (referring to a 30-in. barometer) is that we speak of a 20-in. vacuum or 10 in. Hg absolute. A 28-in. vacuum would be 2 in. absolute. In other words, the inches of vacuum subtracted from 30 will give the absolute pressure.

Boiling Point of Water

Although water boils at sea level at 212 F., the boiling point is reduced to 193 F. if the pressure is reduced to 20-in. absolute. If the pressure is reduced to 2-in. absolute, the boiling point drops to 101 F., and at 1-in. absolute, the boiling point is 79 F.

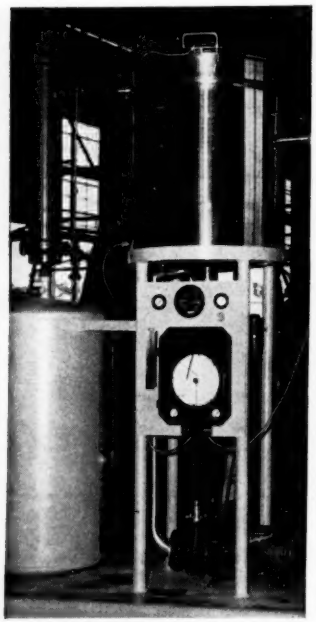
If the pressure is reduced to 0.18 in., which is approximately 29.8 in. vacuum, the boiling point coincides with the freezing point so the water will boil and freeze at the same time. Water cannot exist in the liquid state if the vapor pressure is 0.18 in. Hg absolute or lower, but can only exist in the frozen state, which is ice.

Latent Heat Defined

Although we know that water boils at different temperatures, depending on the vapor pressure over the water, heat must be supplied to the water to cause the boiling. The measure of heat units used in this country is the B.t.u. (British thermal unit). One B.t.u. is the amount of heat required to raise 1 lb. of water 1 deg. F. In order to change 1 lb. of water to 1 lb. of steam at the same temperature, it is necessary to add approximately 1,000 B.t.u. The heat so added is referred to as latent heat of vaporization. In order to condense the 1 lb. of steam, or change its state from a gas to a liquid at the same temperature, it is necessary to extract the latent heat of vaporization —1,000 B.t.u.

Boiling Under Vacuum

If a vessel is connected with a vacuum-producing device of such capacity that a constant absolute pressure is maintained within the vessel, and a liquid is introduced at a temperature higher than the equilibrium pressure, then part of the liquid will

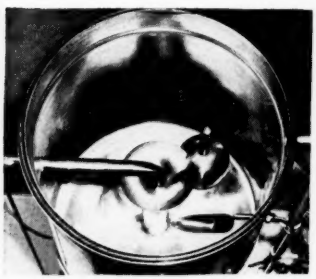


←Uses Steam Jet

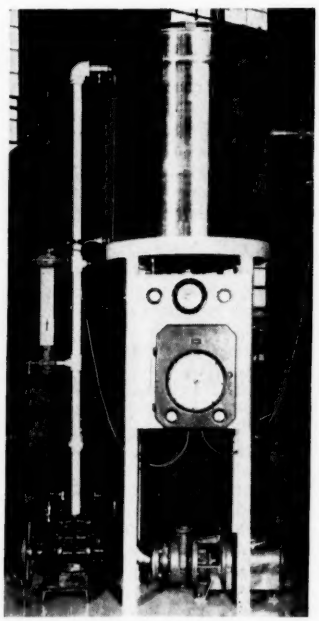
Deaerator for citrus juices employs single stage steam-jet ejector for removal of air. Note surface condenser (left).

Uses Vacuum Pump→

This unit is similar to one on left except that a mechanical vacuum pump (lower left) is employed in lieu of steam-jet.



INTERIOR of shell, common to both units, shows deflector which produces thin film to facilitate air removal. (American Machinery Corp. photos)



be vaporized or converted into steam and the remainder will be cooled down to the equilibrium temperature corresponding to the vacuum. A simple example will be used to clarify this statement.

Let it be assumed that the vessel is evacuated to 1-in. Hg absolute, which is 29 in. Hg vacuum. The temperature corresponding to this pressure is 79 F. If 100 lb. of water at 89 F. is introduced into the evacuated space, some of it will instantly flash into vapor. The heat required for this evaporation will be taken from the water that remains, so that it will be cooled 10 deg. —to 79 F.—with the release of 1,000 B.t.u. This heat will vaporize 1 lb. of water, causing it to change from a liquid to a gas.

If the water is introduced into the vacuum chamber as a finely divided spray, or in the form of a thin film, part of it flashes into vapor. As this vapor is generated throughout the mass of the liquid, a stripping action takes place—bubbles wash out and carry with them the dissolved and entrained air and other non-condensible gases that were present.

This has proved to be a practical, simple, and reliable method of deaerating liquid and semi-liquid food products.

In order to secure reasonably complete deaeration, it is usual to flash the product from 5 to 10 deg. F. In other words, the product will flash down to a temperature corresponding to the vacuum being maintained, so if the vacuum is adjusted or regulated to bear a constant relationship to the temperature of the product entering the deaerator, the product will always flash through a definite range.

Many Foods Heat-Sensitive

Deaeration could be secured by raising the temperature of the product to its boiling point at atmospheric pressure—approximately 212 F. But, since many food products are heat sensitive, product damage would occur. To prevent this, the deaeration of food products, by causing generation of water vapor from the product itself, is usually carried out at subatmospheric pressure.

In order to maintain a constant vacuum in the deaerating chamber, some means must be provided not only to produce the initial vacuum, but to remove the water vapor at the same rate at which it is being liberated.

Boyle's law can be expressed in the form, "The volume of a gas varies inversely as its absolute pressure." This means that, as we increase the vacuum or decrease the pressure, the volume that 1 lb. of water-vapor occupies will increase. At atmospheric pressure, 1 lb. of water vapor occupies approximately 26 cu. ft. and boiling occurs at 212 F. If the pressure is reduced to 1 in. absolute, which corresponds to a boiling temperature of 101 F., then 1 lb. of water vapor occupies approximately 350 cu. ft., and if boiling occurs at the freezing point, 1 lb. of water-vapor occupies 3,300 cu. ft.

Vacuum-Producing Units

Due to the relatively large volume of water-vapor that must be continuously removed from a deaerator, the vacuum-producing device must operate efficiently when handling large volumes of gas at high vacuum. There are many types of vacuum pumps, including the reciprocating piston type, dry rotary pumps of several forms, water jet ejectors, and steam jet pumps. For most applications, steam-jet equipment appears to have many advantages over the other devices.

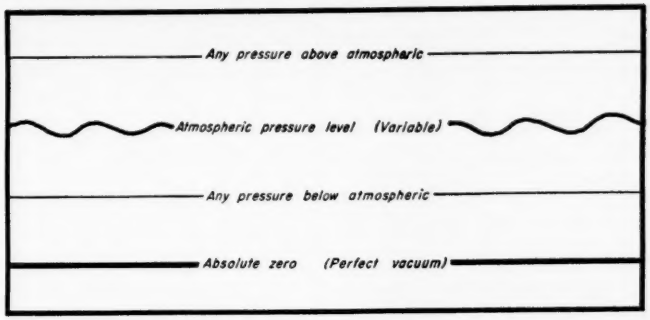
A steam-jet vacuum pump is essentially a kinetic energy device in which steam is expanded through a cone-shaped nozzle, under the conditions that produce very high velocity as the steam leaves the nozzle. This high velocity cylinder of steam entrains surrounding gases, and the mixture enters a venturi-shaped diffuser, where the velocity head is reconverted into pressure higher than that at the suction, but materially less than that of the motive steam.

For relatively low vacuums—that is down to 4-in. absolute or 26-in. vacuum—single-stage steam ejectors, discharging to atmosphere, can be used. For lower pressures, it is necessary to resort to two or more stages. In other words, there is a limit to the pressure range of the steam jets, and for higher vacuums it is necessary to use more than one stage. Two-stage units will operate within the range 0.4 to 4 in. Hg, and if it is desirable to operate at pressures less than 0.4 in. Hg, three stages are required.

Steam Jets In Multiple Units

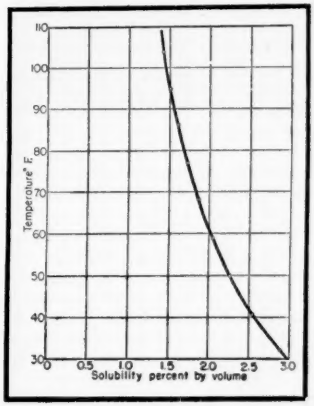
There are a number of combinations of multi-stage ejectors that can be used, and the proper selection depends upon the circumstances of the case. The simplest arrangement is where one ejector discharges directly into the suction of a second, without the use of an inter-condenser. This arrangement is lowest in first cost, but the operating cost is high, because the second stage must have capacity for removing not only the non-condensible gases but

Pressure Chart and Air Solubility Curve

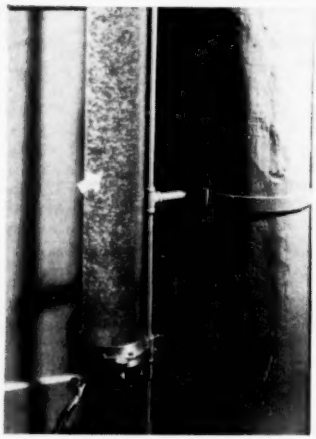

Any pressure above atmospheric
Atmospheric pressure level (Variable)
Any pressure below atmospheric
Absolute zero (Perfect vacuum)

BAROMETRIC PRESSURE is the level of atmospheric pressure above perfect vacuum. "Standard" atmospheric pressure is 14.695 psi., or 760 mm. Hg. The gage pressure is measured above atmospheric pressure, while the absolute pressure always refers to perfect vacuum as a base. Vacuum, usually expressed as in. Hg, is depression of pressure below atmospheric level.

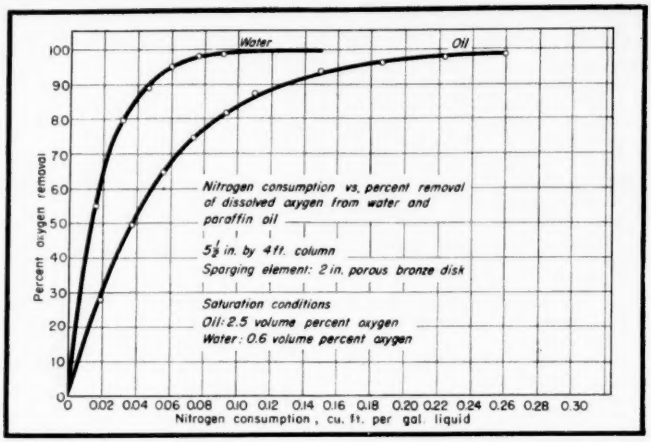
SOLUBILITY of air in water, or → in liquid or semi-liquid foods containing a high percentage of water, decreases as temperature increases.



New Gas-Replacement Method Shows Promise



EXPERIMENTAL UNIT, 5½ in. dia. x 4 ft. high, demonstrated efficiency of oxygen removal from water by stripping with nitrogen.


Water
Oil
Percent oxygen removal
Nitrogen consumption vs. percent removal of dissolved oxygen from water and paraffin oil
5½ in. by 4 ft. column
Sparging element: 2 in. porous bronze disk
Saturation conditions
Oil: 2.5 volume percent oxygen
Water: 0.6 volume percent oxygen
Nitrogen consumption, cu. ft. per gal. liquid

DEAERATION by stripping with nitrogen is, in effect, a gas-replacement process. Accordingly, its economy is governed by nitrogen consumed. Chart (above) shows nitrogen consumed in removal of oxygen from water, and from oil, in experimental column (left). (Linde Air Products Co. photo and chart.)

also the motive steam from the first stage. Usually, an inter-condenser is placed between the two jets so that the steam from the first stage is condensed. Capacity of the second stage is then determined by the amount of non-condensible gases to be removed.

When three stage units are required, it is customary to use an inter-condenser between each two stages. Therefore, the unit would consist of three steam ejectors and two condensers, the last ejector discharging direct to the atmosphere. If discharge of steam to atmosphere is objectionable, an after-condenser may be used to eliminate the nuisance.

Vacuum-Regulating Device

A simple and effective method of regulating the vacuum is to use a control instrument that can be adjusted to maintain a constant difference between temperature of incoming and outgoing product. For example, this instrument may be set to maintain a differential of 8 deg. Then, it adjusts the vacuum so that the exit temperature of the product is always 8 deg. lower than the inlet temperature.

The vacuum adjustment can be a device to throttle the connection between the deaerator shell and the vacuum pump, or air can be admitted to the vacuum pump to partially overload it, thereby reducing the vacuum in the deaerator. These temperature-vacuum-regulating devices are reliable and accurate.

It is surprising to note that, where investigations have been made on deaeration of food products, little importance has been attached to the correlation of vacuum to temperature of product. Some deaeration will occur under reduced pressure, but unless the pressure is reduced to a point whereby actual boiling and auto-refrigeration takes place, it is almost impossible to secure complete deaeration. Even boiling is not sufficient, since the product should be exposed in very thin films or small droplets.

Because steam jet ejectors are used more extensively than any other vacuum producing device, some of the maintenance and operating problems will be discussed. Steam jets are designed to operate at the available pressure, and they work most efficiently at this pressure. Reducing the pressure below this value causes the jet to "break", and then steam flows into the vacuum chamber.

Constant Steam Pressure

In other words, if the steam pressure at the nozzle is reduced, the high velocity column of steam does not have sufficient kinetic energy to overcome the higher pressure beyond the venturi-throat, and a reverse flow takes place, completely destroying the vacuum. On the other hand, if steam pressures are used that are higher than the designed pressure, the volume capacity of the ejector is reduced because the diffuser throat is filled with more steam. Therefore, there is less available area for the gases being evacuated.

Unless steam pressure is absolutely constant and reliable, best practice is to have ejectors designed for a pressure lower than the lowest boiler pressure anticipated and to provide a reducing valve ahead of the ejectors so that they will operate at a constant pressure regardless of fluctuations in line pressure.

The high pressure steam increases in velocity at a tremendous rate as it passes through the nozzle. Being a gas with relatively low density, steam can accelerate rapidly. Entrained droplets of moisture cannot accelerate at the same rate as the steam. Therefore, they tend to reduce the average velocity of the steam and cause the jet to break, similar to conditions at sub-normal steam pressure.

Dry Steam Improves Operation

It is essential that steam jets be provided with dry steam. Hence, well-designed separators should be installed ahead of the jets, and if a pressure reducing valve is used, the separators should be on the up-stream side of it. Separators should be well trapped so as to continuously remove the moisture from the steam. Steam lines should be properly insulated to reduce condensation.

One of the most important details in piping up a steam-jet vacuum ejector is that, if the steam supply is taken from the main header or distribution main, the "T" should always look up, so that any condensation carried along the bottom of the main steam pipe will not be diverted to the branch supplying the steam jet.

When inter-condensers are used,

they can be of the shell and tube type (whereby the condenser water does not come in contact with steam), or the more usual jet or barometric type (in which the condenser water comes in direct contact with the steam).

Two Types of Inter-Condensers

Jet condensers are always cheaper, and they are more efficient because closer terminal differences can be maintained. Since they practically always operate under vacuum, it is necessary to install them at an elevation sufficient for drainage by a barometric leg. If this is not feasible, a pump must be used to remove the water from the condenser at the vacuum existing in same.

A barometric leg is always preferable because there is no operating expense, no moving parts, and, therefore, nothing to cause trouble. If used, it should be of sufficient size to provide low velocity for the condenser discharge, and it should extend in a vertical straight line from the bottom of the condenser to a seal tank at the foot of the pipe.

If horizontal offsets have to be made in the tail-pipe, they should be at 45 deg.—never less than 30 deg.—and preferably close to the seal tank rather than close to the condenser. The barometric leg should be checked and rechecked for tightness, because even a very small air leak in a fitting or screw connection can then cause no end of trouble.

If a pump is used with a jet condenser, the tail pipe should extend straight down to the suction connection of the pump. Even though a pump is used, the condenser should be mounted as high above the suction connection as possible in order to secure the maximum submergence head. A horizontal connection should never be made between pump and tail pipe, and if it is necessary to offset the pump, a 30 to 45 deg. offset should be used.

Three-Stage Jet Unit

If vacuum conditions require a three-stage steam jet unit having two inter-condensers, the condensers will operate at different pressures. The first will obviously be at a higher vacuum than the second. Therefore, the two condensers should be provided with separate barometric legs or tail-pipes, or with separate pumps, if pumps are required.

It is possible to connect the two tail-pipes together if a loop seal is provided in the leg operating at the higher pressure.

In other words, the second, or high pressure condenser leg, should extend down vertically; then, by means of a return bend of 180 deg., the pipe should come back upward at least 8 ft., and thence go horizontally into the leg of the high vacuum condenser.

Condensers should be fitted with sight glasses to indicate if flooding occurs, and the water supply to each condenser should be adjusted according to design conditions of quantity and temperature rise. If condenser removal pumps are used, care should be exercised to see that the sealing gland is maintained in first class condition, because the slightest air leak at this point will cause failure of the equipment. Use of a water-sealed lantern gland is always good practice with pumps that operate under vacuum on the suction side.

Removal of Deaerated Products

The above remarks apply also to removal of the product from the deaerator chamber. The deaerator is always under a higher vacuum than the condensers, therefore the product must be taken from the existing vacuum. The same principles as to barometric leg or removal pumps apply as mentioned for the condensers, with the additional provision that all metal surfaces coming in contact with the product are usually required to be stainless steel, or some equally acceptable material.

There are some products that make it impossible to use a water-sealed gland, due to the chances of contamination or pollution. Under these circumstances, the utmost care should be exercised to keep the packing gland in A-1 condition.

Large Units Need Extra Condenser

For very large deaerator capacities, it is sometimes desirable to use a condenser between the deaerator chamber and the first stage steam-jet evacuator. This permits condensing the water-vapor flashed in the deaerator shell so that the ejector load for all of the stages is limited to the non-condensible gases removed from the deaerator. Where this type of installation is used, the first condenser operates at the same vacuum as the deaerator shell.

In addition to deaerating by vacuum boiling, a very interesting and promising development of recent origin is the method of bubbling nitrogen, or some other inert gas, through the product to be deaerated. The Linde Air Products Co. (a unit of Union Carbide & Carbon Corp.) has carried out extensive research on deaeration by stripping with nitrogen. With this method, one definite advantage over vacuum boiling is that, where products contain volatile constituents, vacuum boiling removes them, whereas nitrogen stripping does not.

In the deaeration of a product such as single strength orange juice, it would appear that nitrogen stripping possesses many advantages over vacuum boiling. The same principle would apply, of course, to many other products. On the other hand, there may be occasions where it is desirable to eliminate volatile products, and here vacuum boiling would possess advantages over the nitrogen method.

Experimental work carried out by Linde indicates that, when using a stripping column of 5½ in. dia. by 4 ft. high (see photo), 99 percent of the dissolved oxygen can be removed from water with the use of .09 cu. ft. of nitrogen per gal. Efficiency of oxygen removal per unit volume of gas consumed is proportional to the effective contact area of gas-liquid interface. This would indicate the desirability of dividing the stripping gas into very small bubble sizes, using a sparging element that produces uniform distribution throughout the cross section of the tower, with a counter-flow operation.

Recent Developments

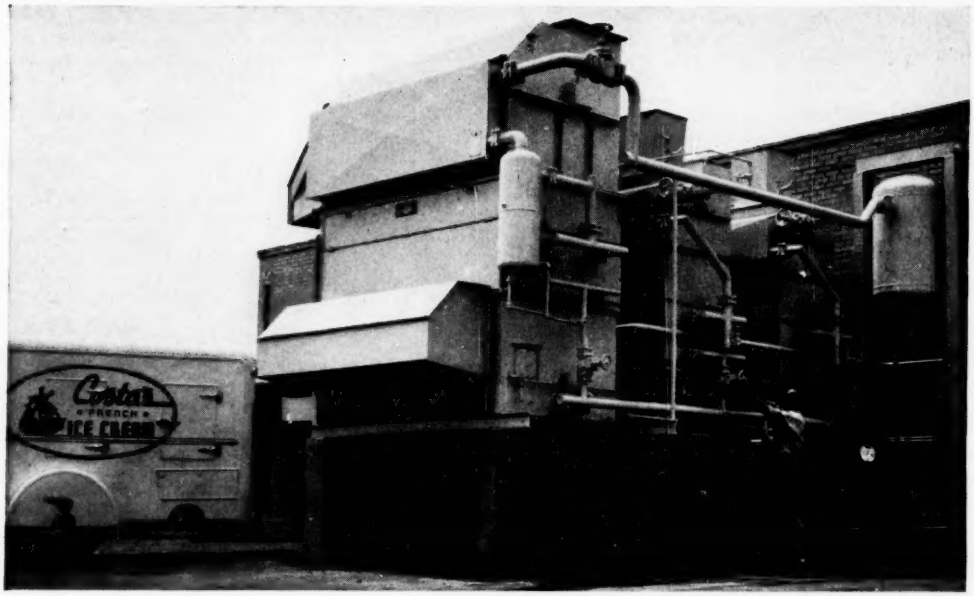
Deaeration by stripping with nitrogen is, in effect, a gas-replacement process. Accordingly, this method would not be satisfactory for products like tomato catsup, because, although oxygen would be removed, the product would be saturated with nitrogen, and probably a large amount of the nitrogen would be retained in the occluded form. This nitrogen would be almost as objectionable in the finished product as the air that it replaced.

In treating any product where it is desirable to remove all non-condensible gases in order to eliminate foaming conditions, the vacuum boiling method is definitely superior to nitrogen stripping.

It is difficult to make cost comparisons of vacuum boiling versus nitrogen stripping because no data is available as to the commercial operation of the inert gas method.

An interesting development that should further interest in nitrogen-stripping has resulted from research of Baker & Co., Inc., a subsidiary of Engelhard Industries. It is a process for the generation of nitrogen by the direct interaction of anhydrous ammonia with air in the presence of an Engelhard catalyst. The unit is known as the "Nitroneal Generator." Apparently, the great advantage of this method is the low cost. Approximate cost of nitrogen gas in cylinders is $14.00 per 1,000 cu. ft. When using ammonia from cylinders, the Nitroneal gas costs about $2.30 per 1,000 cu. ft. The reaction is exothermal, hence the only cost of operation is approximately 100w. for starting and current required for operating the electrical instruments. It is claimed that the gas is completely free of oxygen.

SAVED: Water and Power



THESE evaporative condensers reduced cooling-water requirements by 76 percent, although plant capacity was increased. Operating head pressure was also diminished, resulting in lowered power consumption per ton of refrigeration.

Cooling Performance With a Capital "P"

. . . came quick when this ice cream maker put in new water-and-power-thrifty equipment, plus automatic defrost. Now plant output is highest ever

IVAN C. MILLER
Editorial Consultant, "Food Industries"

It was advanced engineering that set the stage for the notable increase in production recently attained at the Costa Ice Cream Co. plant in Woodbridge, N. J. And most prominent in this engineering was the attainment of a striking economy in cost per ton of refrigeration.

Comparison with figures on the company's previous operations in Metuchen, N. J., demonstrated the progress.

In the new engineering, the following problems pertaining to refrigeration were considered:

1. How to reduce cooling water requirement and at the same time lower the head pressure on refrigeration compressors.

2. How to increase compressor capacities.

3. How to maintain uniform sub-zero temperatures in the ice cream hardening rooms in spite of the warm air infiltration due to opening and closing of doors.

4. How to eliminate the losses in operating time and labor usually associated with defrosting of the cooling system.

Cooling Water a Problem

One of the major items plaguing the old plant was the large amount of cooling water needed for the shell-and-tube type ammonia condensers. In the new plant, Niagara evaporative-type condensers are installed. And now, in spite of an increased refrigeration compressor capacity, the cooling water requirement is 76 percent less.

Upon leaving the compressors, the hot ammonia gas is first cooled in a unit condenser consisting of wet-bulb controlled coils cooled by an air blast. Then, the gas passes through an oil separator and dirt filter before entering the evaporative condensers. Here, cold water is sprayed on the outside of the condensing coils as air is sucked up around them—entering at the bottom of the unit and discharging from the top. Air circulation is produced by blowers mounted on the top of the units. Ammonia in the coils is condensed by evaporation of water on the outside.

Because the ammonia gas is precooled before it reaches the evaporative condensers, the cooling water never gets to the boiling point. Therefore, no scale forms on the coils to diminish the efficiency of cooling. The only water loss in this system is from evaporation.

The system has proved so efficient that it has reduced the load on the compressors, enabling them to meet increased capacity requirements. And at the same time, it has reduced power consumption per ton of refrigeration.

When the shell-and-tube type condensers were used, hot gas pressure often reached 200 psi. in summer. Now,

the pressure during most of the year is between 125 and 150 psi., and as low as 100 psi. in the winter. This has resulted in lower power consumption per ton of refrigeration, and maintenance savings should also be apparent, as well as increased life of the equipment.

Sub-Zero Storage Rooms

The two hardening rooms in the plant, which are kept at —20 deg. F., except during working hours, have a combined capacity of 55,000 cu. ft. During working hours, warm air from the outside has access to the hardening rooms through eight openings—three loading doors, through which 13 trucks are supplied; two walk-in entrances, from processing rooms; and three loading entrances, through which conveyors pass from the processing rooms. Maintaining a sub-zero temperature when there is a constant influx of warm air, presents a real problem in any plant, and usually necessitates frequent defrosting of the cooling units or coils.

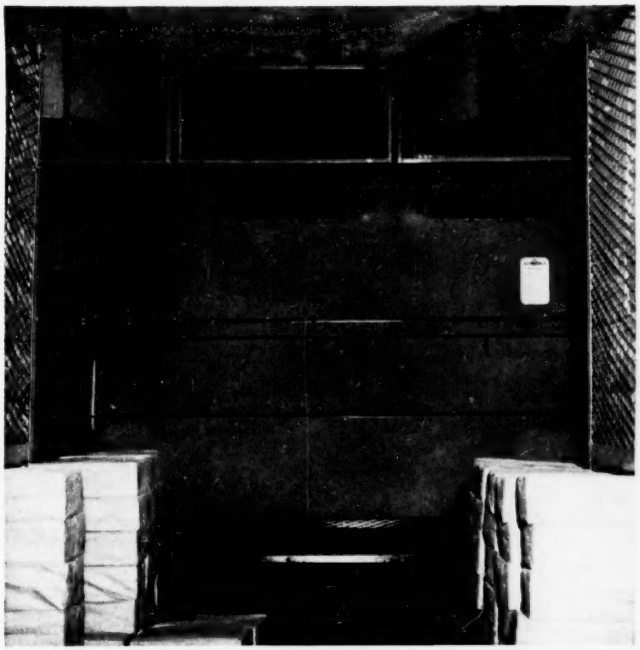
A material saving has been effected through the use of three air blast-type unit coolers, the coils of which are continuously sprayed with a chemical to prevent formation of frost. Full efficiency from the evaporation of the ammonia is thereby obtained with no impairment to quality of product through temperature rise—as would be the case were frequent defrosting necessary. Temperature changes in the hardening rooms are now kept within a safe range, even during the hottest months when production volume is at a maximum.

The chemical condenses the moisture which would otherwise form frost on the coils of the unit coolers. Granted, this moisture dilutes the solution. However, the problem thus arising of the solution freezing on the coils has been obviated by the installation of a continuous concentrator. Liquid flows from the coolers to this concentrator, where controlled distillation evaporates the accumulated moisture, and returns the liquid to the correct chemical composition for re-use in the system.

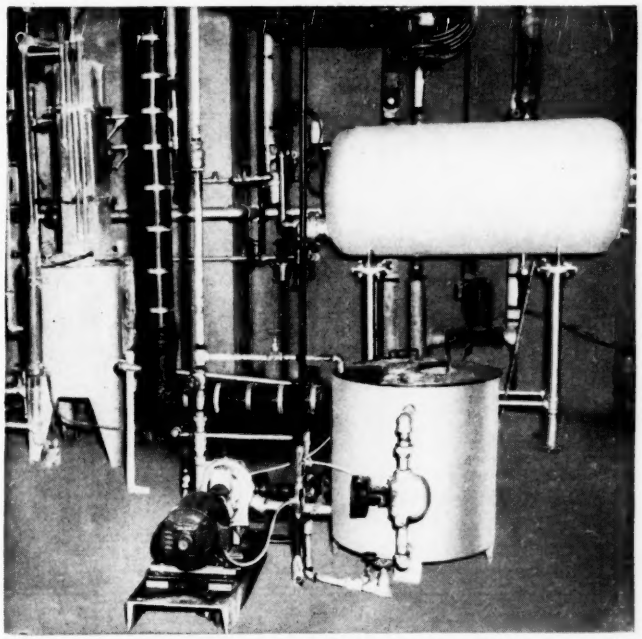
Continuous Defrosting Saves Labor

This cooling system has operated without interruption during the last two years, maintaining desired temperatures. And there has been no manual defrosting, with its attendant expense of added labor, lost operation time, and product quality impairment. And even though the hardening room refrigeration has recently been increased with the addition of another unit cooler, the original concentrator has maintained solution strength and automatic defrosting efficiency.

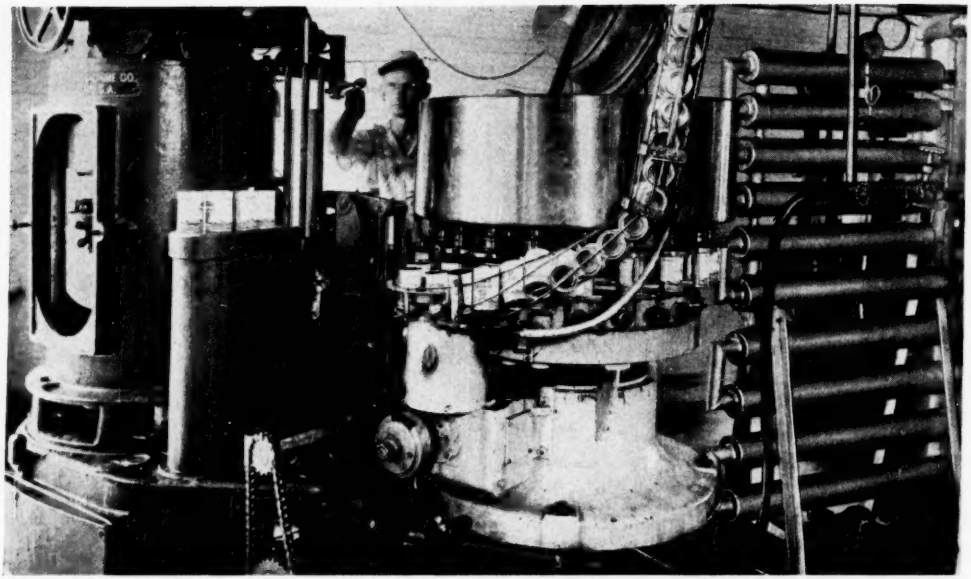
SAVED: Defrost Labor



ONE of the coolers. Three such units maintain hardening room temperatures at 20 degrees below zero, yet require no manual defrosting.



THIS continuous concentrator assures efficiency of cooling units by evaporating accumulated moisture from defrosting solution.



FINISHED VAL-SWEET comes off the canning line. Company also bottles it. Note the heat exchanger (right).

11 Grape Varieties Blended in New Drink

Using California table and wine types, high percentage of fruit constituents is retained in the beverage. Aim is to process 2,500,000 gal. this season

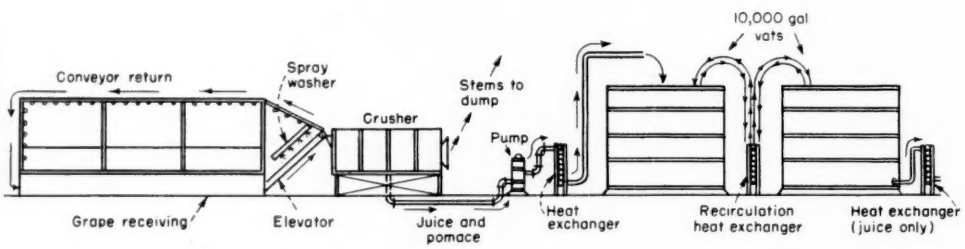
A. SCHAPIRO
Vice-President, California Grape Colony, Lodi, Calif.

Juices from eleven varieties of grapes are blended in the new beverage, "Val-sweet", produced by California Grape Colony. Five of the grape varieties are the kind shipped from San Joaquin Valley as "table" grapes for consumption as fresh fruit. The other six are of the type used in wine making. This mix proved "right."

It is reported that the finished blend represents 98 percent of the 140-deg. water-soluble constituents of the original fruit.

The company, which was formerly

GRAPE BEVERAGE LINE OF CALIFORNIA GRAPE COLONY



located in Fresno, recently moved operations to a large, modern winery at Lodi, Calif. This plant is leased from Italian Swiss Colony. Plans call for the crushing of 12,000 tons of grapes this season—which will make about 2,500,000 gal. of the beverage.

At maturity, the grapes employed have a juice low in acid and high in sugar content. For this reason they are unsuitable for ordinary beverage juice purposes. In short, they are unlike the Concord variety, which is comparatively low in sugar, high in acid.

During the vintage, 100 to 125 tons of grapes are received and crushed daily. The crusher is a large, enclosed, perforated cylinder with revolving paddles arranged on a central shaft in helical order. The clusters of grapes drop into the cylinder and the revolving paddles crush the fruit. The juice and pomace drop through the perforations and are pumped through a heat exchanger to receiving tanks. The stems are ejected from the end of the machine.

The grape juice, skins and seeds are next pumped to tanks. The juice of the black varieties and the juice of white grapes are kept in separate tanks. Extractions of the white grapes are later passed through the pomace of the black varieties in order to recover the residual color. And finally all extractions are blended.

Second step in extracting juice from these grapes is to separate the free-run juice from the pomace. This juice and pomace mixture is pumped from the tanks to a heat exchanger and heated to 140-160 deg. F. to cause the cellular structure of the fruit to release more free-run juice. And, in the case of all varieties, this heating also extracts more body and color from the skins. The material is routed from this heat exchanger to redwood extraction tanks (10,000 gal. capacity) where, within a few hours, the skins and seeds rise to the top and the free-run juice is then drawn off at the bottom and pumped to a holding tank.

Free-run juice is so called because it is that derived from the crushing operation. It varies from 22 to 28 percent soluble solids, depending on the varieties of grapes crushed.

Remaining Sugars Leached Out

Since California grapes run high in soluble solids, the pomace remaining in the tank still retains substantial grape sugars that can be extracted by leaching.

At the outset of the season, the first water extraction was, of necessity, done with clear water at 140 deg. F. A quantity of water identical to the amount of the free-run juice (which was drawn off the pomace), was added to the remaining material. During this process the temperature of the material and water is carefully controlled at the 140 deg. F. by recirculating the mixture to a second heat exchanger and then back to the tank.

Within a few hours, the pomace again rises to the top of the dilute juice extracted from the skins. This juice, which tests approximately 16 degrees Balling, is then pumped to a separate tank. Subsequent leachings, five in number, each provide a diminishing amount of soluble solids. The first, as mentioned above, tests about 16 degrees Balling, and the fifth at approximately 2 degrees Balling.

The 2 degree juice is then used for subsequent leaching of richer pomace tanks, until it is built up to 16 to 18 percent soluble solids determined by the Balling hydrometer. This juice is then used to dilute the free-run juices to 20 degrees Balling. It is drawn into the vacuum pan as needed. Clear hot water is used only in the fifth and last pomace leaching.

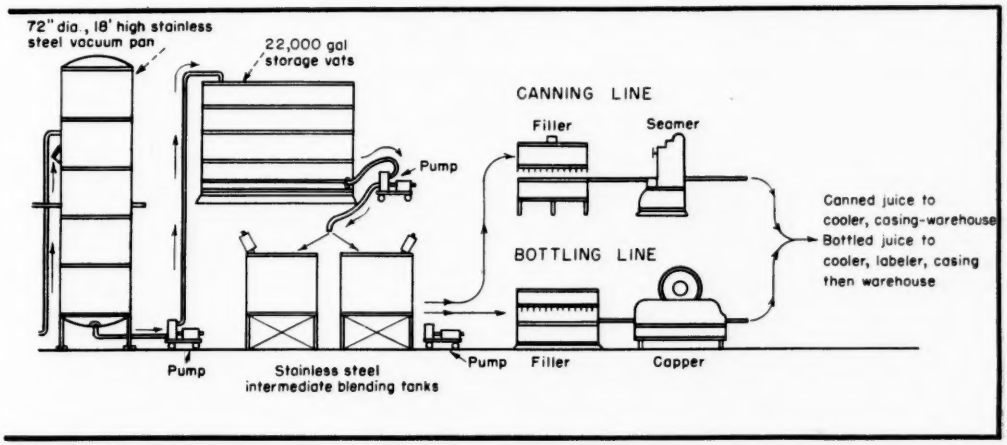
Certain leachings are maintained between 100 and 120 deg. F. to permit the development of higher acidity and distinctive flavors by selecting microorganisms of the acid producing type, normally used in food industries. Later, this juice is carefully blended with the juices fed to the vacuum pan. Resulting concentrated juices at 70 deg. Balling are then removed to storage. The acidity and concentration permit keeping at normal temperatures.

Pasteurized Before Concentrating

The juice is drawn from storage tanks and flash pasteurized before entering the vacuum pan. This pasteurization, prior to concentration, reduces the thermophilic bacteria that may have survived the leaching temperatures. Temperature in the vacuum pan is held at 110 to 115 deg. F. Steam mixed with condensate water at 3 psi. maintains this temperature in the heating coils with no danger of burning the product. With an input of 25,000 gal. of juice per 24-hr. day, this vacuum pan delivers 5,000 gal. of concentrated juice at 70 deg. Balling.

The pasteurized concentrated juice is then pumped to storage tanks, where it is held until needed for blending and then canning or bottling. It is stated that this juice represents a nutrient value such as obtained in eating grapes while eliminating skin and seeds.

From the storage tanks, the concentrated juice is pumped to stainless steel blending tanks located in the canning and bottling room. The final product is standardized at 17 Balling, which is slightly higher than straight Eastern juices with no sugar added. Tartaric acid, U. S. certified food color, and specially formulated anthranilic esters are then added.



It's faster with headroom high . . . **. . . step low**

STANDING straight up, salesman as well as customer can easily select food items for immediate delivery.

SINGLE low step makes salesman's job less tiring, and it's more inviting to customers entering truck.

Step-In Drive Trucks Spark Sales

Meat-product distributor serving Detroit-area retailers finds decided advantages in new route van's greater headspace, easier handling

INCREASED sales, greater ease of operation, and more positive refrigeration are major advantages resulting from the fleet modernization effected by the Peters Sausage Co. These improvements came with the adoption of new step-in drive trucks with Kold Hold plates, replacing conventional chassis that used water-ice refrigeration.

The company delivers prepared meats in Detroit and the surrounding area. Its line consists of 30 luncheon meats, 10 smoked meats, canned ham, lard, corn meal mush, and pigs' feet in jars. Sales of these items mainly are made to independent meat and grocery stores and delicatessens catering to the "higher-class" trade.

Dodge step-in drives, with insulated bodies, are the new trucks added to the fleet. They have a clear inside height sufficient for a man to stand up and move around without stooping over. It is this stand-up height, plus the easy one-step front entrance door characteristic of the step-in drive design, that have helped increase the route sales.

Buyers Can Browse

Store owners are able to enter the truck body and select the items that they think will sell well—in much the same manner as housewives browse around a store before they make a final selection from a variety of commodities. This was not possible with the old type bodies because of their insufficient headroom and the inconvenience of the rear door entrance after climbing up two or three steps.

The company reports that this new selling technic has tended to boost sales on all of the delivery routes on which they have been used. One salesman who covers 35 stores daily in the Dearborn area just outside of Detroit, is reported to have increased his commissions $18 a week since he started using the new type truck.

Called a route van in the trade, this new truck has a greater ease of operation resulting from its inherent design. The driver enters his driving compartment from either side of the truck by simply taking one step up from

the sidewalk through sliding doors. These doors can be left open when the truck is moving from one stop to the next, if the driver so desires.

With the old style trucks having cabs separate from the bodies, it was necessary for the drivers to take at least two steps into the cab and to close the cab doors between every stop. A greater loading volume also can be obtained with the new vehicle, because the body is carried forward over the engine instead of having the engine out in front, as in the conventional chassis.

Easy Handling

The latter feature of design permits a greater body volume on a shorter wheelbase. And the shorter the wheelbase, the greater is the ease of operation, particularly in parking on congested streets.

The Kold Hold plates used on the new vans provide a more certain, more convenient, and less expensive means of refrigeration than the wet ice used on the old trucks.

To date the company has five of the new vans in service. Two more, now being processed, will enter the route sales service as soon as completed.

The vans are of two sizes—one with a body 7½ ft. long and the other with a body 9½ ft. long. Still others, planned for the future, will have 12½ ft. bodies for wholesale deliveries.

At present, the company operates 27 route-sales trucks. Besides the 5 new Dodges, there are 22 conventional trucks, 19 of them with Kold Hold plates and 3 with ice-cooled bodies. In addition, 5 spare trucks are on reserve, 4 with Kold Hold plates and 1 with ice cooling.

Recharging Systems

All except three of the truck bodies with Kold Hold plates have the plates recharged from the ammonia refrigeration system of the Peters plant. The three not so serviced have their own individual refrigerating units on the truck chassis with electric plug-in connections for over-night recharging. None of the new vans carries its own unit.

The ice-cooled trucks are the oldest in the fleet. Eventually, they all will be replaced by route van trucks with Kold Hold plates.

The new vans come as a complete unit of chassis and metal panel body, but the body is neither insulated nor refrigerated. Hence the first step is to convert the standardized production unit into a serviceable refrigerated vehicle. The sausage company had this done by the Proctor-Keefe Body Co., a Detroit truck-body builder.

First, a transverse body bulkhead with a door was added. This bulkhead is located directly behind the driver's seat. Bulkhead and floor, side walls and rear end were then insulated with 4 in. of Fiberglas and the roof with 6 in. of Fiberglas.

This construction provides a completely-insulated compartment, closed at the rear and entered through the door in the front. The door itself is of full height—of the insulated ice box type—and 27 in. wide. It is hinged on the side nearest the driver's seat and opens outward into the driver's compartment, away from the sliding door on the curb side of the truck.

Inside the compartment, directly behind the insulated door, is an open step-in working area facing three levels of removable horizontal shelves, on which the meat products are carried. All made of maple, the lower shelf is 19 in. above the floor, the middle shelf 15 in. above the lower shelf, and the top shelf 15 in. above the middle one.

An electric dome light is located inside the refrigerated compartment on the ceiling of the step-in working area. This light, which illuminates the working area and the meat products carried on the shelves, is automatically lit and turned off by the opening and closing of the bulkhead door. The space beneath the lower shelf is used to store fresh meats, packages, and the wire delivery baskets used by the driver-salesman to carry the orders from the truck into the store.

Refrigerating System

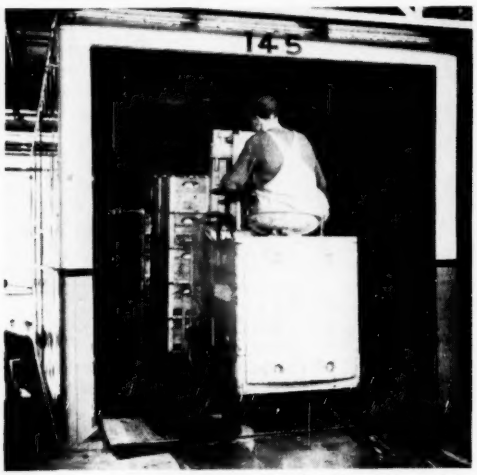
The Kold Hold plates refrigerating the compartment are located crosswise of the compartment at the rear, near the ceiling, with an air baffle plate ahead of them. The baffle helps to circulate the cool air throughout the compartment and prevents the meats carried on the shelves from touching the plates. The ammonia intake and outlet valves used to recharge the plates are located on the front compartment bulkhead—inside the driver's compartment, near the ceiling above the driver's seat. In this position the mechanic attaching the ammonia lines can stand erect instead of kneeling.

And short body is boon in driving, parking

VAN handles much easier in traffic, parking. Credit goes to short wheelbase of compact, yet roomy, vehicle.

With new cleats . . .

. . . and clamps



—cases go on and off truck safely

—storage is simple, space-thrifty

"No-Topple" Palletizing Slashes Handling Costs

Boston dairy effects 75 percent saving in moving, storing bottled milk. System adaptable to other open-case goods

A SYSTEM employing palletized unit-loads handled by electric fork-lift trucks can effect marked savings in man-hours and man-power in transporting cases of milk, both in bottling plants and at distributing stations.

This has been notably demonstrated by the Whiting Milk Co., large Boston milk processor. Experience over nearly two years shows economies of approximately 75 percent in time and men required to load trailers at the bottling plant. And a similar saving is made at the distributing centers.

How They're Held

Securing the cases to pallets to prevent shifting or side-slip was overcome by company engineers when they devised special cleats (see photo). Fastened to the middle piece of a 3-stringer single-faced pallet, they engage the underside of the milk cases.

In addition, a special clamp was developed to prevent the 5-layer-high piles of filled or empty cases from toppling. This clamp fastens together the cases forming the top layer of the unit load.

Pallets have been standardized at $31\frac{1}{4} \times 37\frac{1}{2}$ in. This permits loading distribution trailers with pallets two abreast and eight deep. Cases of square bottles are loaded six to a layer, while cases of rounds are placed four to a layer. Average weight of a unit-load of 30 cases of filled square bottles is slightly in excess of 1,500 lb.

Here's how the system operates: At the bottling plant, cases of filled bottles are conveyed from the filling room to the loading platform, where they are placed on pallets. Care is exercised to arrange the bottom layer of each load so that the cases engage the special cleats on the middle stringer of the pallet. When fully loaded, the top layer of cases is fitted with the holding clamp.

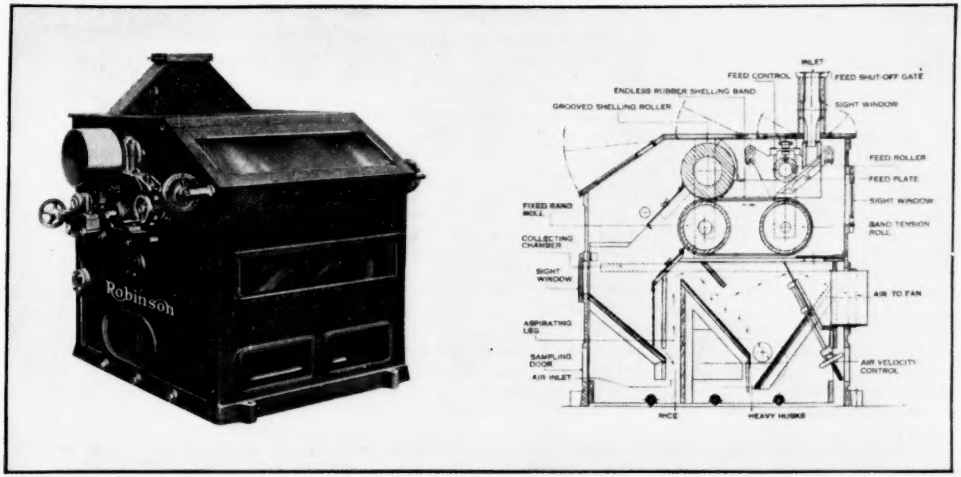
Savings Detailed

By using fork-lift trucks and pallets, a trailer can be loaded in 15 min., whereas, when hand trucks were used, approximately 1 hr. and two or three men were required.

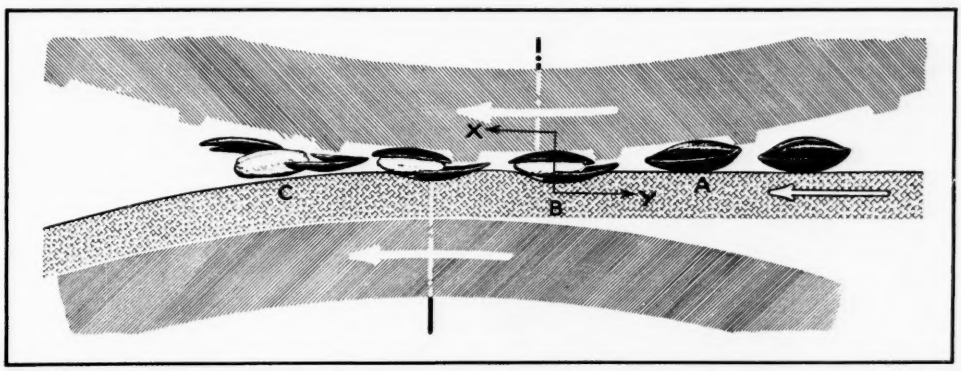
Then, at the distributing center, the loaded pallets are removed from the trailer by a fork truck and stored in the refrigerator. The trailer, after being filled with pallet loads of cases of empty bottles, returns to the main bottling plant. The entire operation at the distributing center takes one man with one truck approximately 30 min., as contrasted with the previously required 1 hr. for three men.

In addition to the notable savings in time and labor, electric fork-lift-pallet handling of milk in cases is reported to have brought these extra advantages: It decreases bottle breakage and loss of products, it reduces traffic congestion on the loading dock, and it conserves space for storage and other essential uses.

Huller, Its Parts, and Details of Shelling Action



HERE is the new hulling machine. And its various component parts are depicted in drawing on right, where arrows indicate direction of travel of grain through unit and points of collection of both the shelled rice and husks.



HOW grain is hulled. At Point A, tooth on upper wheel moves grain at wheel speed. At B, grain is momentarily held in rubber belt and the forces, X-Y, function to remove hull. Shelled grain and husks are thrown off belt at C.

High-Vitamin Grain Milled by New Units

Rice retains more of its mineral and Vitamin B content when hulled and whitened by machines that reduce germ breakage. Equipment was developed in England

PAUL WEST

British Information Services, New York City
With photos and drawings, courtesy The Allied National Corp., Ltd., Buying Agent

Incorporating new principles which depart from traditional rice milling, two new machines — the Wemanco huller and whitener—are now turning out a grain that scores exceptionally high in vitamin retention. Now in use in Iraq, units are being supplied to the Netherlands East Indies and other rice producing countries. And in the United States this same equipment—under the name, Moulsdale Brown Rubber Rice Sheller—is being employed by a number of rice millers in Texas, Louisiana, Arkansas, and California.

It was Thomas Robinson & Son, Ltd., Rochdale, Lancashire, England, that developed the new vitamin conserving equipment. The machines used in the U. S. are made and dstributed by H. T. McGill, Houston, Tex.

More than half of the world's population lives on rice, the staple diet of many Asiatic countries. Paddy rice has a lower nutritional value than

grain, but it contains starch, minerals and—most important of all—vitamin B. Years of research have proved this vitamin to be indispensable in the prevention of the paralytic disease known as beri-beri, so widespread in Eastern countries.

It is, therefore, essential that the valuable substances should be retained in the rice as far as possible during the milling of the grain for human consumption.

Rice-milling consists mainly of the hulling and whitening processes. The latter is known in some countries as pearling, polishing or scouring. Hulling removes the coarse, inedible husks which have no nutritional value. After hulling, the rice is whitened, a process which imparts the brilliant "pearliness" to the rice grains.

The conventional, mechanical methods of hulling and whitening, however, have the disadvantage that they tend to rob the paddy rice of some of its mineral and vitamin B content. These valuable constituents are contained in the germ and in the thin aleurone layer of the bran. Hulling normally causes the germ to break.

Tests have shown that a considerable amount of the germ is lost in this way —as much as 95 percent in some instances. In the subsequent whitening process, a large proportion of the aleurone layer is removed, so that the finished, highly-polished rice hardly contains any minerals or vitamin B. What remains is only a starch product.

It is obvious, therefore, that the invention of improved methods of hulling and whitening augurs well in the interests of the rice-eating peoples of the world. Thomas Robinson & Son has succeeded in constructing milling machines that minimize the inroads made upon the mineral and vitamin B content of the grain.

Germ Breakage Reduced

One of these machines is the Ideal Huller, in which only a very small percentage of the germs break. This is due to the fact that the machine does not depend upon the use of milling stones or abrasives, but uses a combination of rubber and metal. Moreover, the husk is removed in a single operation. The remaining treatment of the rice grain is replaced by gentler methods.

Rice entering the huller passes through a feed roller to a continuous 31½-in.-wide rubber belt, whereon it travels in a continuous layer of grains (across the full width of the belt) into the shelling area (see detail sketch of hulling action).

As each grain reaches the shelling area—seen at Point (A) in the sketch —it is entrained in a notch in the grooved shelling roller (fast roll). Here, it is firmly gripped by the tooth behind and starts to move at the speed of the roll. The lower surface of the grain meanwhile is being pressed into partial embedment in the resilient rubber belt.

At first contact, the band deflects readily, since pressure is light and the grain slips easily over the rubber. However, as the grain approaches Point (B), it becomes embedded more deeply in the belt. And resistance to deflection increases very rapidly, until the lower hull on the belt is momentarily held from slipping.

Forces X=Y (see sketch), acting in opposite directions, function at this point and cause the leading edge of the grain to be forced through the hull. Shelled grains and hulls are then thrown off the band at Point (C) and go into a collecting chamber.

From the bottom of the collecting chamber, hulls and grain pass into an aspirating leg. Here, the heavier grain continues to fall, but the hulls are carried over into a second collection point.

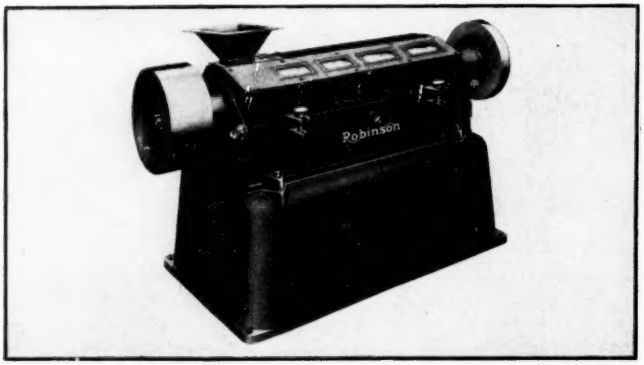
In this way, every ripe grain, irrespective of size or shape, may be hulled. The delicate tips of the grain do not get chipped. Moreover, none of the endosperm is crushed or lost, and even protruding germs remain intact. The machine is capable of hulling 1 ton of rice an hour.

Polishing the Grain

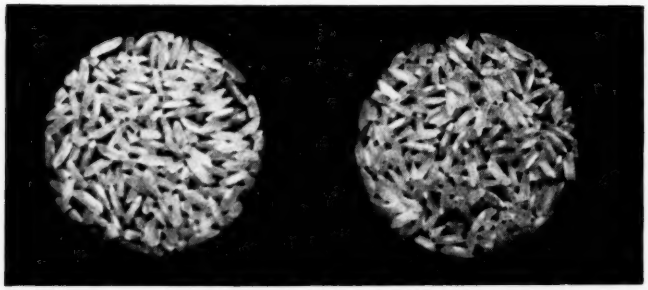
The second machine is the Ideal Whitener, a polishing machine operating on an entirely new principle. The whitening is carried out by means of a specially grooved rotor, the movement of which causes the meal to be peeled off the rice grain. At the same time, the mass of rice is subjected to a friction-process by a rapid pulsating movement. Throughout the entire treatment, the rice is safeguarded from any undue pressure, so that the percentage of breakage is very low. The finished rice leaves the machine with an attractive, white pearliness.

By means of a special regulating device, the degree of polish may be varied according to requirements. Should a few rice grains remain unpeeled in the machine, the husk residue may be disposed of by the action of the motor. The machine is capable of handling 1,000 to 1,500 lb. of rice an hour, and it boasts a very low current consumption. The unit is enclosed in a dust-proof metal casing.

Polishing Unit and Samples of Whitened Grain



WHITENING, or polishing, of rice is accomplished in this machine by action of a specially grooved rotor which peels the meal off grain.



SAMPLES of rice show whitening effect. Left: Grain that has been through machine once. Right: Twice through. Degree of polish may be controlled.

We Think . . .

■ Other Processors Can Take a Tip From Progressive Bakers

It is clear to those who attended the recent bakery convention and equipment show in Atlantic City that the baking industry is doing something about its problems. It is finding the answers through new and improved machines.

The principal problems spurring the bakers to progress are common to many other branches of the food industry. The prices of raw materials—such as flour, shortening, sugar and frozen eggs—have increased in recent months, surpluses notwithstanding. Such is the effect of government price-support activities.

Labor, both in production and distribution, has risen 10 to 15 percent for some bakers, and is still tending upward as more and more unions demand pension plans and other social benefits. Increases in these two major cost items are enough to start the bakers seeing red ink, but freight rates and other items have gone up, too. With these higher costs pushing against consumer price resistance—abetted by allegations on the part of government officials that bakers could cut prices—the industry finds itself in a nice profit squeeze.

Then there are two other burrs under the baker's saddle. One is pressure on the part of health officers for an even higher level of cleanliness in bakery plants. The other is competition from prepared mixes, which the bakers say are increasing baking in the home and taking business away from them.

These conditions, in the opinion of a prominent midwestern baker, add up to this: "Either we modernize or we go out of business." Another baker says the same thing in different words: "If we do not modernize, we cannot absorb increasing costs without raising prices—and that would be disastrous today, with competition keener than at any time since the prewar days."

These are strong statements from an industry which enjoyed a production increase of more than 40 percent in ten years, and which still is running at a high level. But they are statements based upon a realistic view of current conditions. And they apply quite as much to some other branches of the food industry as they do to baking.

But as we said, leading bakers are doing something about it. They are spending money to save money. One, for example, indicated during the meeting at Atlantic City that he was investing $250,000 in new machines. And one equipment exhibitor said that he booked orders totaling $200,000 in one afternoon at the show.

The bakers are laying out this money for machines which perform operations formerly done by hand, such as depanners and pan greasers; for machines with higher production capacity, including wrappers that handle up to 75 loaves of bread a minute and a new mixer that puts cake batter production on a continuous basis; as well as for "sanitized" equipment which meets the requirements of health department inspectors. Equipment manufacturers have done a good job of meeting the bakers' requirements. One alone has eight different new and improved machines.

So there is no cause to worry about the future of progressive bakers. But those who try to get by with antiquated plants are in for trouble. And other food processors might well take a tip from bakers on how to solve their problems.

■ F&DA Takes Step Foward in New Regulation

Experimental distribution of foods that do not comply strictly with standards of identity will be allowed under a new regulation of the Food & Drug Administration. Temporary permits will be issued to legalize this departure from normal requirements under clearly defined conditions which were announced in mid-October.

This action is an answer to the frequently made charge that the system of food standardization applied by F&DA is an impediment to progress. We doubt whether it has ever been a really serious obstacle. But it must at times have discouraged executives when their research men proposed changes in foods subject to standards of identity. And it is well to have that situation corrected.

Now the question is: Will the new rules work well? We believe they will. But they will require a real spirit of cooperation between industry and government.

On the part of industry, there must be a careful and conservative approach to novelty in order to demonstrate fully "the basis upon which the (new) ingredient is believed to be wholesome and nondeleterious."

In return, government must take a sympathetic attitude toward new developments—whether or not they seem particularly attractive to officials—so long as they are safe. And if there be careful and adequate preparation of proposals by industry, the government can be expected to give sympathetic consideration.

Which puts the first move toward successful application of the new regulation squarely up to food processors.

■ Prepackaging Should Be a Phase of Food Processing

Prepackaging is here to stay. Consumers like it, and retailers find that it reduces their selling costs by facilitating self-service. In fact, it has caught on so fast and so solidly, that packaging experts and technologists who must solve the problems are in somewhat the same position as the man who has a bear by the tail.

From the viewpoint of consolidating efforts and brains to work out the problems, the prepackaging industry is to be complimented on holding its first convention, in October, and also on forming an association. We do question, however, the soundness in setting up a separate prepackaging group, because many of the problems are so closely associated with food packaging in general that a pooling of activities with an existing packaging association might have produced better results.

Be that as it may, fruit, vegetable and meat processors

have a stake in prepackaging and should closely watch it in the months and years ahead. It offers competition to canners and perhaps presents an opportunity for some of them near population centers. As the demand for prepackaged products grows—and it is skyrocketing—the volume involved will make prepackaging plants feasible and open a new area for processors. Certainly, for highest efficiency and lowest cost, prepackaging should be done on a mass-production basis.

A&P's Atlantic Commission Co. has amply demonstrated the feasibility of a plant for grading, washing and prepackaging produce.

The larger meat packers are keenly interested in the prepackaging of meat, and some of them are wrapping luncheon meats and sausage products especially for the self-service stores. Fresh meat cuts, however, present so many problems that the packers shy away from prepackaging them. Yet large retailers are likely to press for prepackaging of such products by packers. And the first meat company to offer such service will have quite an advantage over competitors.

We think that prepackaging is destined to become an industry. And it should be a part of the food processing field—not a retailing, wholesaling or farming function carried out by inefficient methods and without proper technical control.

■ Pension Plans Benefit Company as Well as Employees

Regardless of union demands, pension plans for workers should be given careful consideration by the food processing firms that have not adopted them.

Seasonal workers, of course, would have to be excluded from such a plan, but even a seasonal business has a year-'round core of employees. And a small corporation might not be able to meet the costs of a fixed pension plan through the bad years of a business cycle without wiping out its surplus.

But a pension plan can be geared to profits. That is, a certain percentage of profits can be used to build pension funds. This arrangement has the added advantage in good years of taking a large part of the pension cost out of income which otherwise would be lost through taxes. Further, workers may put forth a little more effort if they know they are sharing somewhat in the profits from their proficiency.

A pension plan is a great builder of better employee relations. It allays one of the most common of all fears on the part of workers—that they will be embarrassingly dependent upon some one else in their declining years. Consequently, there are warm spots in the hearts of employees for the firm which provides for their support when they no longer can do a hard day's work. And if there is anything business needs in these days of union domination of labor, it is warm spots in the hearts of employees.

In addition to improving employee-worker relations, pension plans—like company-sponsored group insurance—reduce the labor turnover. A valued employee will think twice before he walks out on security in his old age. And the longer he stays with you, the longer he is likely to stay—giving you the continuing benefit of his accumulated experience.

Anyway, if industry doesn't provide security for workers, the government will do it—and will tax corporations to cover the cost. So either way, industry will pay. How much better to do it directly and improve employee relations, while at the same time helping to stem the dangerous trend toward a welfare state in this country.

■ Packaging Machine Makers Have Challenge to Meet

Need for low-cost transparent packaging films which are gas-tight was pointed out in an editorial in our September issue. This represents a challenge to manufacturers of packaging materials, and with the progress being made in packaging films, there is reason to expect that the challenge will be met.

But this brings up a second phase of the problem of effective and efficient packaging of foods in transparent films. It is the need for machines which will fill and seal flexible packages at a rate of 60 to 90 a minute or more without too many imperfect seals, or pinholes resulting from handling by the machine.

There are tremendous possibilities in the field of food packaging for gas-tight flexible packages filled and sealed at high production rates by automatic packaging machinery. At the moment, the odds are that progress will come faster in films than in machines. But the one without the other is of little value to processors of low-cost foods who must attain high rates of production per man to keep costs in line.

Large food companies with well-staffed engineering departments may work out their own answers. And smaller firms can at least make their need known to the companies from which they buy equipment.

■ Survey Proves Housewives are Finicky, Fickle and Scotch

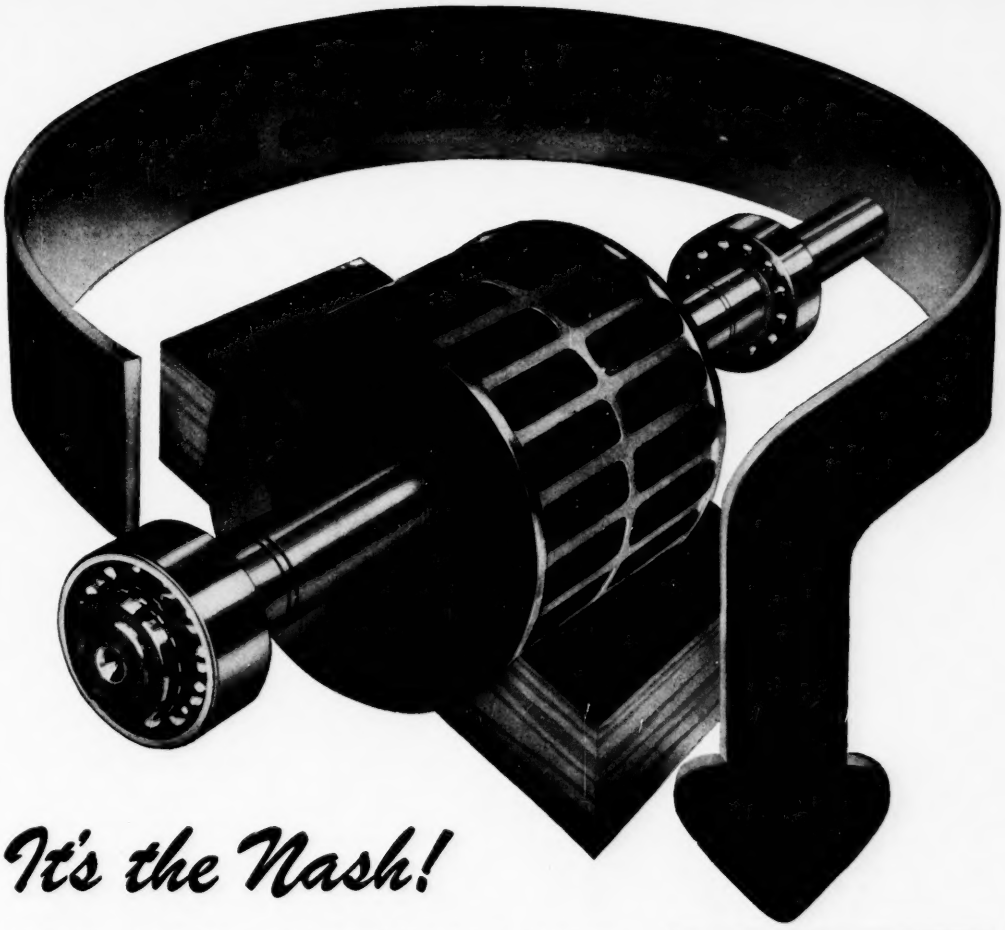
An interesting insight into consumer preference for brands of processed foods is brought to light by the *Philadelphia Bulletin's* study of the market in its area. In buying frozen foods, consumers favored a leading brand, long established and with an unquestioned reputation for high quality. They favored it, that is, except in one instance.

This leading brand rated 11 to 1 against the nearest competitor in frozen vegetables, meats and poultry, and the ratio was 15 to 1 for fruits and berries. But when it came to frozen concentrated orange juice, a new brand was five times as popular as the old frozen-food brand.

Both brands of juice were of top quality, but the new brand sold for a little less. Of course, the frozen concentrate is relatively new, so the well-known brand had not become established for this particular product.

This seems to demonstrate two things: An old brand does not carry its customary weight when put on a new product, because the housewife makes her own quality evaluation. And given two products of about equal quality, the consumer will take the one that costs less, regardless of the brand.

No processor ever can rest on his laurels.



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The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

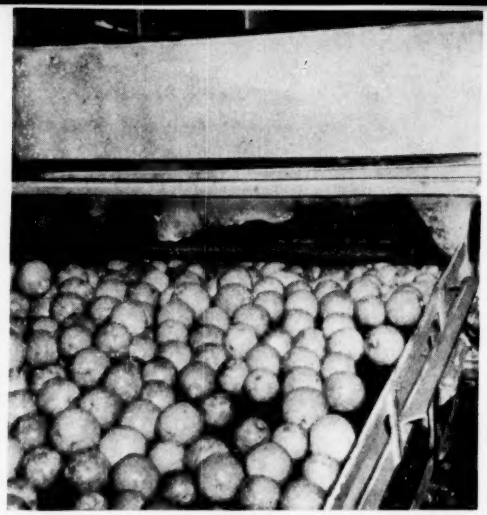
Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

31 WILSON, SO. NORWALK, CONN.

1 **TRUCK LOAD** of citrus fruit (in filled boxes) is weighed on 100 ton scale at packing plant.



2 **SOAPING MACHINE** coats fruit with wetting agent suds to loosen dirt. Fruit is then brushed and spray-washed.

Fresh Citrus Fruit and Marmalade

Uniform Sizes Go to Fresh Market, Under- and Over-Sizes to Marmalade

THERE ARE two objectives in preparing citrus fruit for the fresh fruit market. One is to remove any present source of infection and to fortify the fruit against future contamination. The other is to grade and select on the basis of appearance, and to improve the appearance as much as possible.

Repeated soaking of the fruit with wetting agents, scrubbing with revolving brushes, and rinsing with sprays—as depicted at Point 2 in the flowsheet (right)—removes adhering dirt, one important source of contamination. This also improves the appearance of the fruit. Treatment with sterilizing agents further removes sources of contamination.

Waxing (Point 7) serves two functions. It minimizes the chances of future contamination by sealing each fruit against the inroads of mold and bacteria. Waxing and polishing also materially improve the appearance of the fruit.

Grading for size is important, too. Best market price is dependent on size, uniformity, color and absence of skin blemishes. At the plant of Fosgate Growers Cooperative, Forest City, Fla., oranges are automatically size-graded as they pass through the fresh fruit preparation line. Our diagram indicates the steps in preparation of the fruit for the fresh fruit market.

Also diagrammed are the steps in the manufacture of citrus marmalade at the jam and jelly plant of Chester C. Fosgate Co. Fruit for this process are the under- and over-size ones from the fresh fruit packing plant.

In the latter operation, selected fruit from the packing house is first conveyed to the extractors in the jelly plant. Juice from the extractors passes through the pulper-finisher, which removes pulp and seeds. It is then pumped to holding tanks supplying the cooking kettles (Point 9). Peel is transferred to a specially designed cutter that makes razor-thin slices. Sliced peel, juice, sugar, and other ingredients, are brought together and cooked in the kettles.

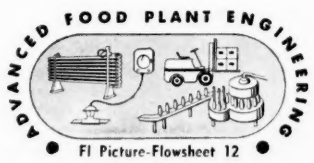
After cooking, the finished marmalade goes directly to machines that hot-fill it into glass jars. Tangerines are hand reamed to extract the juice.

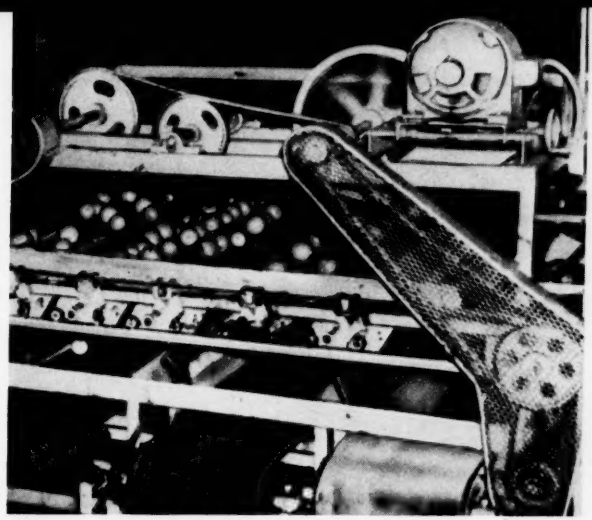
Jars are vacuum closed, then conveyed to a fog-spray cooling tunnel. Cold water, supplying each bank of the sprays, enters through a strainer, which removes sediment that might clog the nozzles, thus reducing cooling efficiency.

Final temperature of jars is dependent upon the length of time they are exposed to the cold water spray. And this is controlled by the speed of the conveyor that carries the jars through the cooling tunnel. The conveyor has a variable speed drive. Finally, the cooled and dried jars of marmalade are inspected, labeled, and packed for shipment.

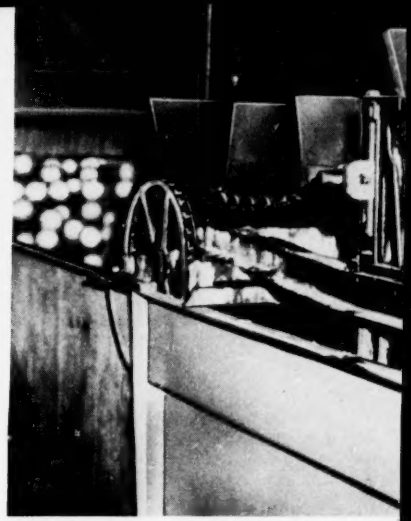
Operation of the three production lines in the cooperative's Forest City plant are continuous. Maximum operation efficiency is obtained by an elevated central motor control station where, through push-button control, one man can stop or start any or all of the 350 motors on the production lines. Thus, should there be any interruptions on a line, down-time can be reduced through control-panel selectivity.

FOOD INDUSTRIES Dec. 1949 Pages 96-99



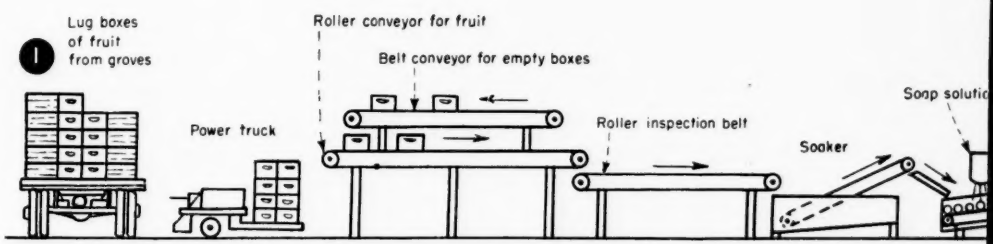


3 SIZE GRADER automatically selects uniform fruit for the fresh market. Over- and under-size fruit go to marmalade processing.

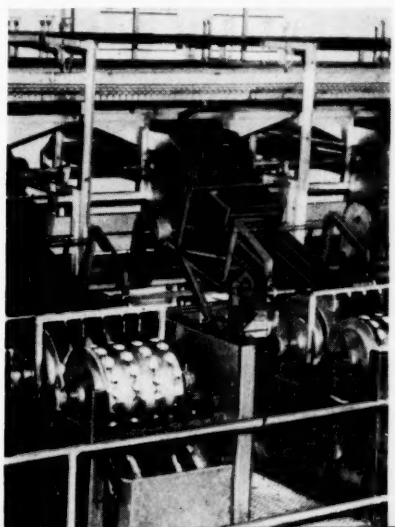


4 BORAX SOAK TANK. Paddle-equipped chain is moved through borax solution. This treatm

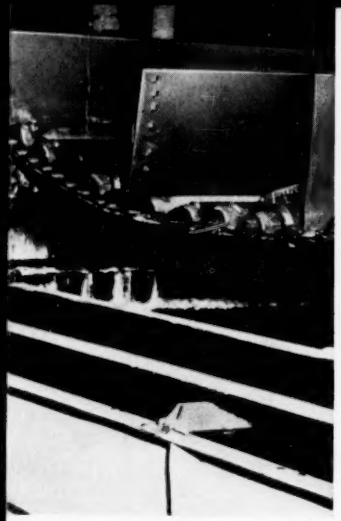
PREPARING CITRUS FRUIT FOR BOXING .... AND PRODUCT

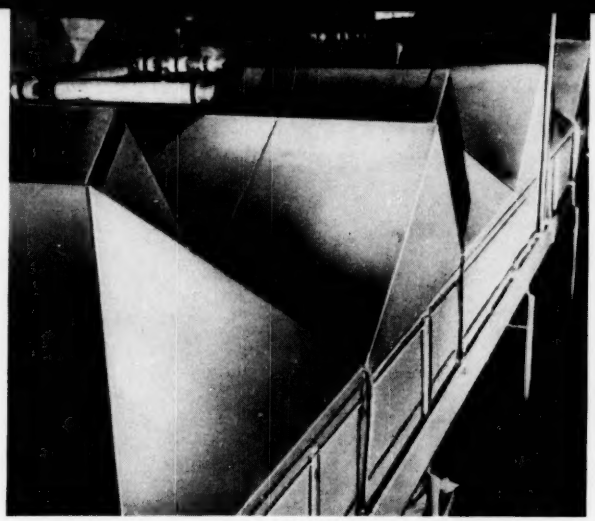


8 EXTRACTORS separate juice from peel—the first step in marmalade making.



9 STEAM JACKETED KETTLES, in which marmalade is cooked, with tanks (above). They are made of stainless steel.

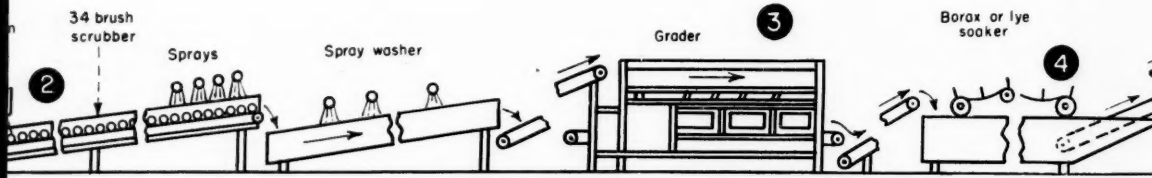




conveyor (top right) submerges fruit as it
ent prevents mold growth.

5, 6 **DRYING.** Washed fruit are moved through series of dryers (left) on a revolving roller b
is evaporated from fruit by hot-air blasts, which come from steam heating units (right

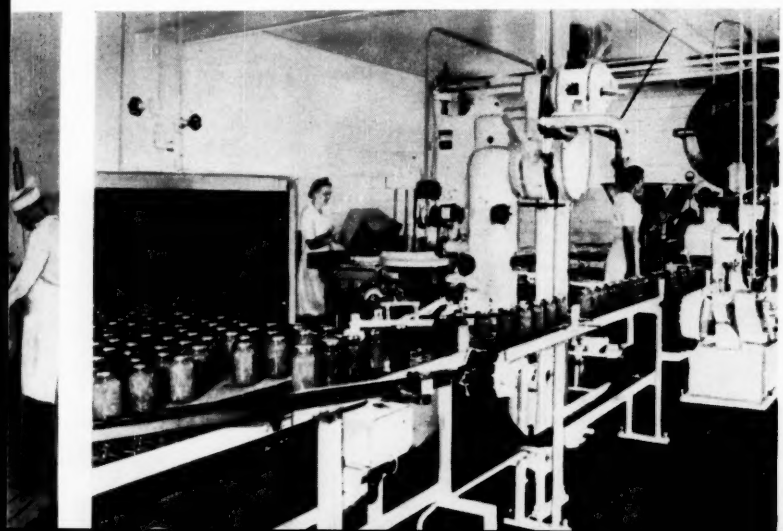
ON OF MARMALADE

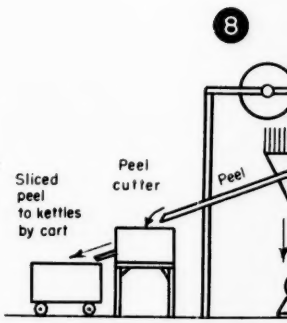


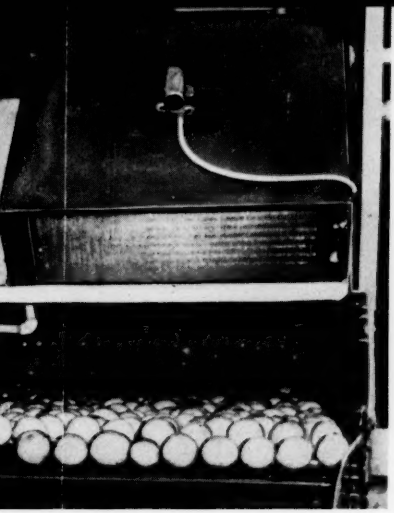
CITRUS M

storage

10 **PACKAGING.** Left: Jars are emptied onto unscrambler. Right: They are filled and closed. Foreground: Filled jars enter fog-spray cooler.

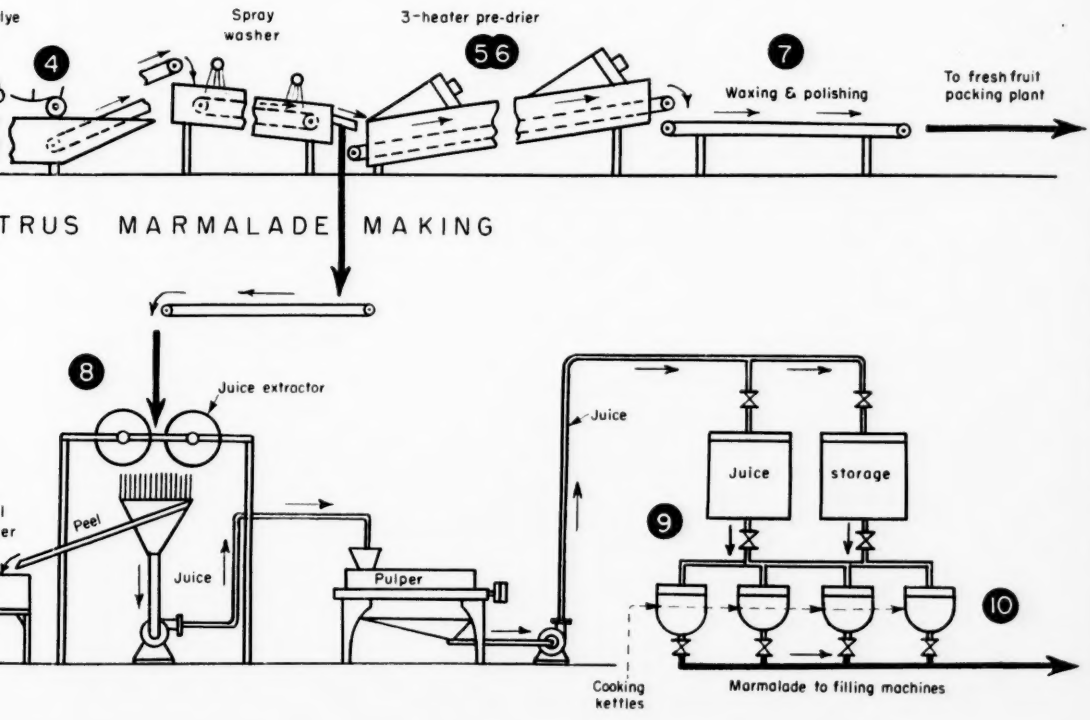






revolving roller belt conveyor. Excess moisture
ating units (right) located on dryer's roof.

7 WAXING AND POLISHING. Selected fruit is sprayed with molten wax, dried, then polished with brushes before packing for shipment.



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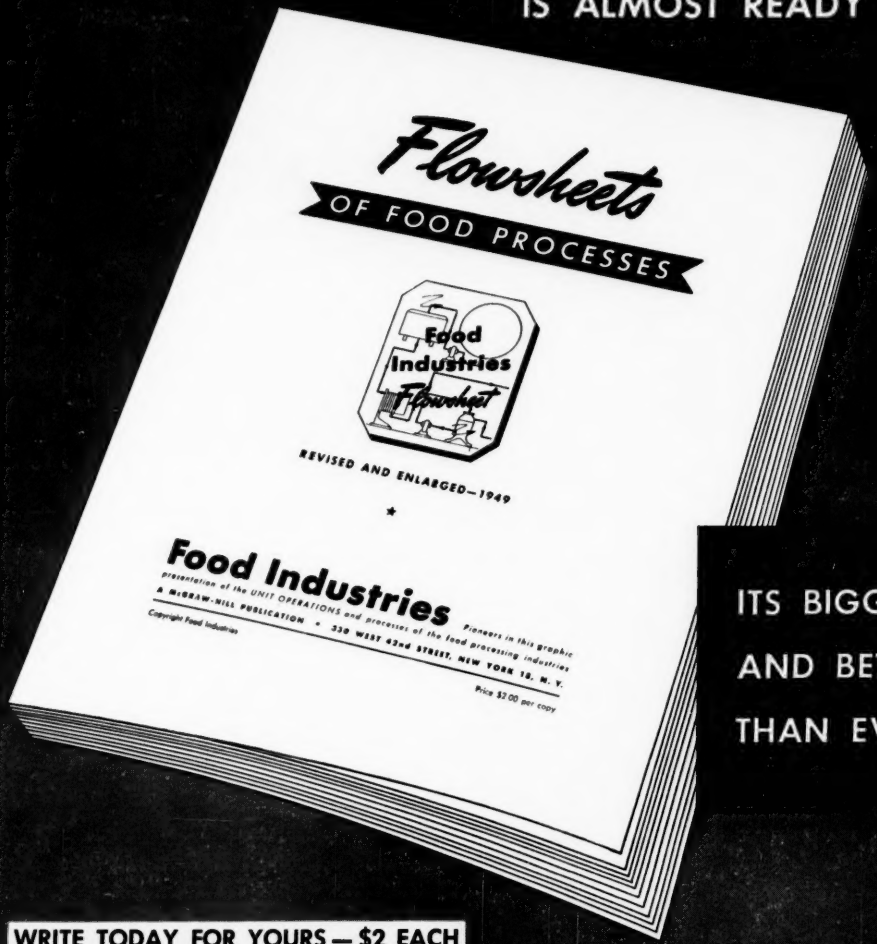
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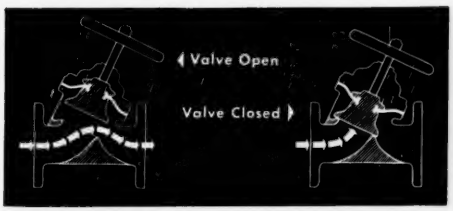

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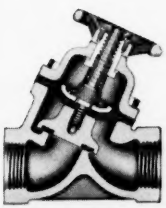
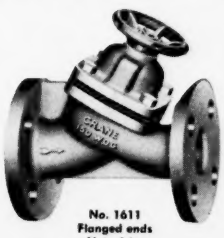
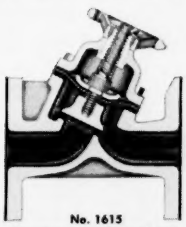


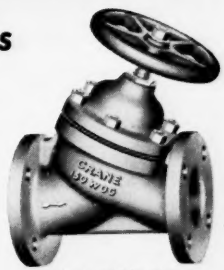
No. 1610
Screwed ends
½ to 2-in.



No. 1611
Flanged ends
½ to 6-in.



No. 1615
Neoprene-lined, Flanged ends
½ to 6-in.



2½, 3, 4, and 6-in. valves, Plain iron or Neoprene-lined, have rising, turning stem

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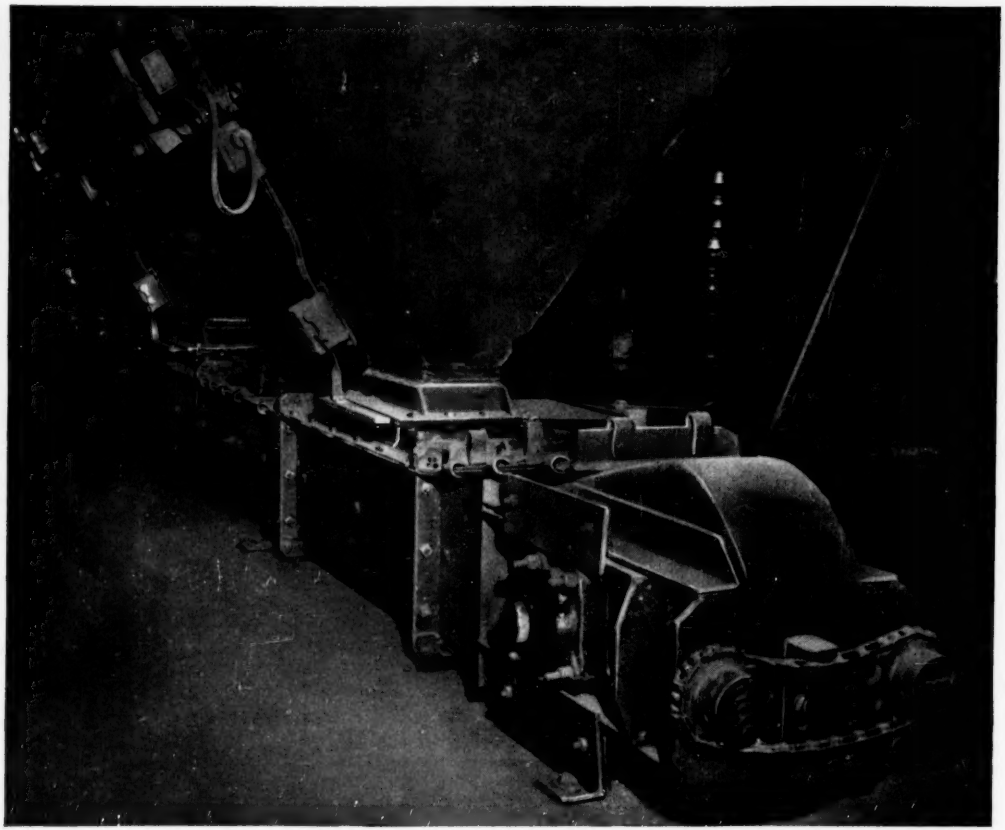

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The Labor Union Monopoly Bites *ALL* Workers

What kind of government is it which:

. . . Prosecutes the Great Atlantic & Pacific Tea Company which it asserts handles about 6½% of the retail food distributing business as an illegal monopoly in restraint of trade, and

. . . Seeks to break up four big meat packing companies and make them into 14 companies, charging the four with being a monopoly in restraint of trade, but

. . . Makes no move whatsoever to apply the federal anti-trust laws to the exercise of virtually 100 percent monopoly control of labor in the coal industry, and the only slightly less complete monopoly control of labor in the steel industry?

The answer to that question is simple. It is class government of the most flagrant type, a government by which special privileges are dispensed without justice and to the great injury of all workers. It is the kind of government which will lead to the early sacking of the American enterprise system and the personal freedoms of workers.

In legal terms the explanation of this flagrant affront to good government is also simple. In 1932 labor union activities were given virtually complete exemption from the application of the federal anti-trust laws by passage of the Norris-LaGuardia Act.

continued on next page

When the Norris-LaGuardia Act was passed labor unions were relatively weak. Only about 16% of the nation's industrial workers were organized, only about 12% of the steel workers. About two-thirds of the coal miners were union members, but only half that number were paying dues. The country was in the depth of its worst depression. The unemployment of about one-fourth of the labor force made monopoly control by labor seem so remote as to be almost fanciful.

But after only seventeen years devoted to the promotion of labor union organization by the federal government, we have labor monopoly with us. In its power and scope it makes the alleged business monopolies being prosecuted under the federal anti-trust laws seem positively piddling. In its manners it makes the old-time business monopolists look like Lord Fauntleroys.

What is lacking, grievously lacking, is action by Congress; action to shape our federal anti-trust laws to take account of the labor monopoly that has become the dominant national force in our country today—a force that is leading to the loss of freedom of all workers.

Before labor monopoly is broken up, as it must be broken up if our economy is not to be permanently wrecked, other steps will no doubt be required. But one test more than any other will be the touchstone of the nation's determination to keep its economic and personal freedom. It is what it does to see that labor monopoly receives the same treatment under the federal anti-trust laws as any other kind of economic monopoly.

The purpose of the federal anti-trust laws is to break up monopoly and preserve fair competition in the United States. It is a fine purpose. The wisdom and fairness of its application in particular cases is often open to challenge. But in spite of bad administration every farsighted business man I know is a staunch defender of our national anti-trust policy.

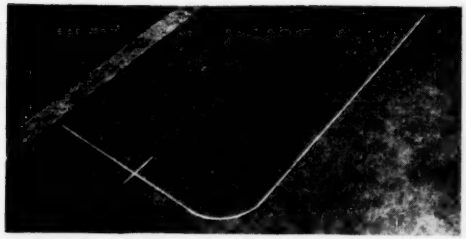
At present, in the exemption of labor monopoly, we have a breach in that policy which, if not closed, will soon become fatal both to the policy and the enterprise system it is designed to foster and protect.

The main thing wrong today with Great Britain and indeed all Europe is that no effective anti-trust laws are in existence to protect the public from business and labor monopolies, to guarantee personal freedoms. No free economy in Europe or America can prosper as long as protected monopolies remain and flourish.

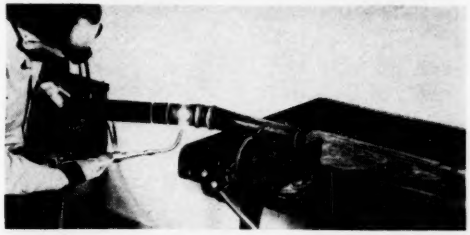
While your representatives in Congress are home with you talk to them about the special privileges now granted to labor union monopoly. You would serve your country well by finding out what they intend to do about it before it is too late.

President, McGraw-Hill Publishing Company, Inc.

PRACTICAL IDEAS



Pattern line



wrinkle bending

and finished job

One Way to Bend Steel Pipe

An easy way to shape steel pipe to a desired line—also almost any other pipe except cast iron—is the wrinkle method.

A wrinkle-bend is actually a series of wrinkles or "creases" in the wall of the pipe. Each wrinkle produces only a small change in direction. For a sweep-bend, the creases are spaced far apart, and for sharp bends they are close together. A welding blowpipe and a vise are the only pieces of equipment necessary for wrinkle-bending steel pipe up to 2 in. dia.

How to make a right angle bend in a 2 in. standard pipe is shown in the accompanying pictures. To form a bend of a lesser angle, make each wrinkle smaller or decrease the number of wrinkles.

First, draw the bend wanted on the floor (see top photo). This line should be the outside shape of the pipe. Now lay the pipe on the pattern and mark the pipe where the bend should start. This is the location of the first wrinkle. At 1½-in. spaces, score four more lines. Radius of the bend determines the spacing of the wrinkles.

Now clamp the pipe in the vise, take the blowpipe, and with the flame adjusted to neutral, heat the pipe along the first chalk mark. For two-thirds of the pipe circumference, heat a band about ¾ in. wide. Continue heating until the pipe turns a light red. Stop heating and pull on the pipe to form a wrinkle. The amount of the wrinkle depends on the angle of the bend.

Before starting the second wrinkle, allow the first heated band to cool to a black heat. Making of the third wrinkle is shown in the middle photo.

Upon completion of the last wrinkle, check the pipe against the pattern on the floor. If corrections are required to get the desired bend, reheat the wrinkles one at a time and increase or decrease as needed.

Be especially sure, before heating each successive wrinkle, that the pipe cools to a black heat. The bottom photo shows how accurately the bends can be made.—*The Linde Air Products Co., New York City.*

$25 EXTRA FOR BEST ITEM

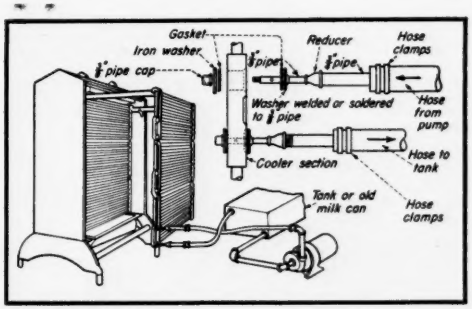
You are invited to submit items for this "Practical Ideas" department. You will be paid at regular rates when your item is published, and if it is judged the best for the month, you will receive additional pay of $25.

Selection of the best item will be made by a group of 200 readers each month, and the name of the author and item title will be cited in these pages in a subsequent issue.

"Practical Idea" items may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. The item may concern factory, laboratory, warehouse, or power-plant operations in the food industry. "Practical Ideas" pertaining to management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit "Practical Idea" items. The text will be edited and sketches converted to finished drawings.

Send your items to: "Practical Ideas" Editor, FOOD INDUSTRIES, 330 W. 42 St., New York 18, N. Y.



Food Plant Equipment Easily De-Scaled

Wherever water is used as a heating or cooling medium in equipment, scale or deposit is gradually formed on the inside of the heat-transfer surfaces.

Too few food plant managers realize that this scale can reduce the efficiency of performance to the extent that proper temperatures cannot be maintained, thus having a detrimental effect on product quality.

Operating costs would be lowered, equipment life extended, and product quality protected if plant routine called for clean-up of these "inside" surfaces periodically and religiously.

To illustrate how food processing equipment can be descaled easily, a procedure worked out for a cabinet-type milk cooler is described:

The treatment for the water side of the cooler may be set up as a circulating system. As shown in illustration, a tank or an old milk can is hooked up to a pump to act as a source of supply. And old pump should be used because even inhibited acid is slightly corrosive to all metals other than stainless steels.

A pipe line is then connected from the pump to the cooler inlet, with a return to the tank. Volumes required for filling coolers of various sizes are as follows: Coolers with ¾-in. tubing, 1 gal. per 60 ft. Those with 1-in. tubing, 1 gal. per 30 ft. From 5 to 10 gal. should be added to the calculated volume to cover headers, piping and a supply ahead of the pump. The amount of scale in the system will determine the time required to remove it.

Circulation of a 25 percent solution of inhibited muriatic acid should be maintained at least 30 min. After the acid treatment, the system should be drained and flushed with water. To neutralize any acid remaining, the system should then be flushed with an alkaline powder solution (1 lb. to 10 gal. of warm water).

In any system the amount of scale will depend upon relative water hardness, time equipment is used, and the processing temperature. Deposits will be greater with higher temperatures. Water containing suspended solids in addition to hardness will develop more scale than will silt-free water.

This means that need for treatment must be judged by the operator. As soon as he notes a slowing down of heating or cooling, it is time to consider de-scaling. However, impellers on circulating pumps should be inspected to be sure that slow heating is not due to low velocity.

This method of de-scaling is not confined to heating or cooling sections. Any other piece of equipment, such as pasteurizers, coil machines and washers, can be cleaned by modifying the recirculation arrangement to suit the design of the machine.—*Based upon item in Cherry-Burrell "Circle," Cherry-Burrell Corp., Chicago.*

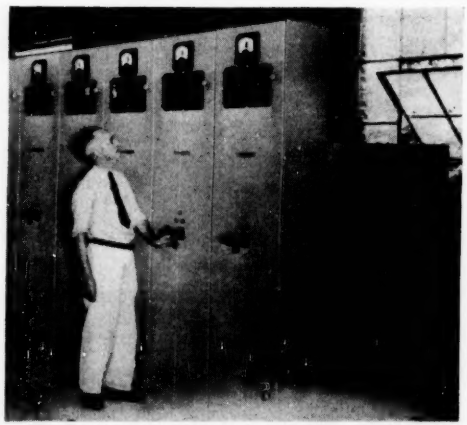
Mobile Laboratory Serves Dual Purpose

Complete laboratory service to franchised plants is provided by Canada Dry's mobile quality control laboratory. Owned and operated by the parent company, this equipment also plays an important public relations role.

Periodical microbiological checks are made by the traveling laboratory on all processing equipment in each plant visited. Moreover, checks are made on the mineral and organic purity of the water used for carbonating, and the uniformity of syrup and pressure in the finished product. To meet quality requirements in any of the franchised plants, the traveling chemist initiates any changes necessary.

Preceding the mobile unit's visit to each plant, newspaper publicity announces that the mobile laboratory will be open to the public for inspection at a prominent location in the town. The traveling chemist explains and illustrates to visitors the extent to which quality control is maintained over all products produced in the local plant.

Thus, the unit becomes an important public relations implement and promotion medium, as well as a low cost method for maintaining rigid quality control.—*Ivan C. Miller, Editorial Consultant, "Food Industries".*



Power Supply Made More Dependable

Rapid expansion of production of frozen foods at Seabrook Farms, Bridgeton, N. J., necessitated a considerable increase in electric power, it being estimated that a 12-oz. carton of lima beans, for example, requires ¼ kwh. for growing, processing, packaging and freezing operations. To meet this demand, the company boosted its power supply from 2,500 to 12,500 kva.

In aligning its power facilities to production demands, Seabrook took steps to assure the continuous flow of electric current to each part of the process, thereby minimizing costly production delays. Modern 15-kv. metal-clad switchgear (see picture) was installed to replace the inadequate low-voltage switchboard which lacked the capacity to properly control and protect the stepped-up power supply. This switchgear consists of 28 feeder units, each operating independently of the others. And several of the feeders directly serve the large refrigeration compressor motors and brine pumps as protection against a major refrigeration failure. Other feeders supply power to different parts of the property for various processing operations.

This type of switchgear is completely enclosed in steel to prevent inadvertent contact with live parts and resultant shutdowns. The power-interrupting devices are removable and interchangeable, facilitating periodic inspection and making maintenance easy.

In revamping its power services, Seabrook also increased the capacity of the transformers by installing transformer cooling fans.—*General Electric Co., Schenectady, N. Y.*

SAFEGUARD YOUR PRODUCTS
Ship in Anchorglass* Containers and Cartons

WE at Anchor Hocking have a keen appreciation of your shipping problems and a keen appreciation of the necessity for tough and durable glass containers and shipping cartons. As a result, every effort and skill is exerted to supply packaging materials which will provide thorough, dependable protection for your products after they leave your hands.

Anchorglass Containers are manufactured by glassmakers with many years of experience, and are backed by extensive quality controls. And, before cartons are fabricated, board samples are subjected to puncture, crush and bursting strength tests. Packed cartons are punished in drop, impact and revolving drum tests . . . all to predetermine safe delivery for your products.

May we send you samples for test purposes?

*Reg. U.S. Pat. Off.

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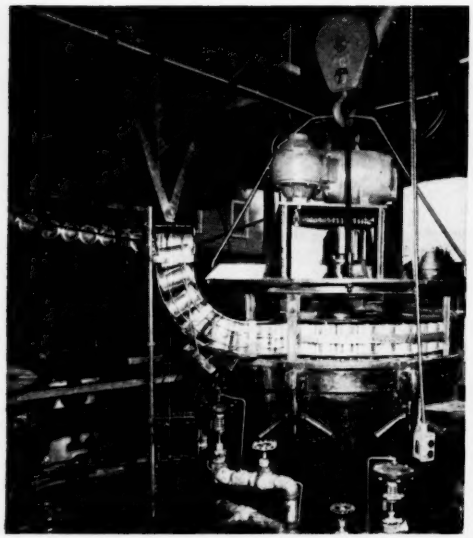
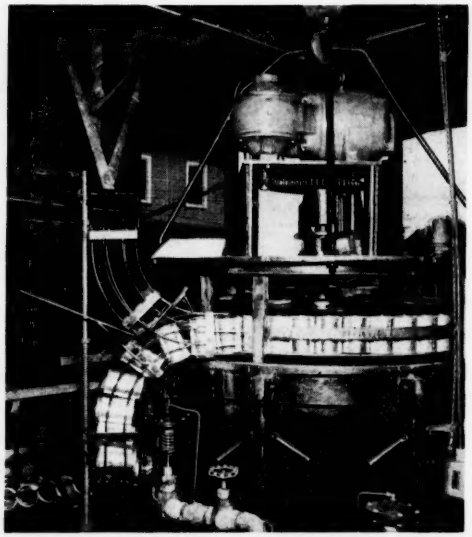
Lancaster, Ohio

Food Equipment News



INGOING: 300 cans per min.



OUTGOING: 600 cans per min.

Loader-Unloader Slashes Retorting Costs

Fewer employees are required and processing time is speeded in retorting by a new loader-unloader unit. Further, it voids the necessity of using crates or cooling canals.

Labor of 7 to 11 workers is saved for each closing machine or canning line. Retorts can be loaded at the rate of 300 cans per min. and unloaded at double this speed. By rotating the cans during the cooking period, a faster heat transfer is effected, reducing the process time. And that means additional savings.

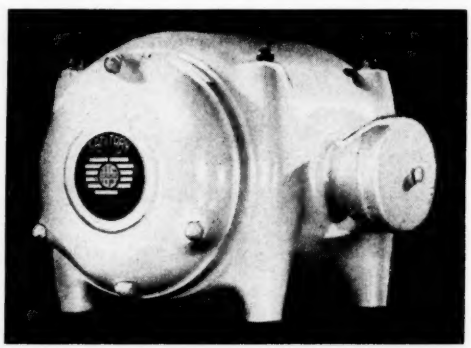
The machine comes to the industry fully developed and proven following two years of tests in the laboratory and a successful commercial pea and corn operation this year in a Wisconsin canning plant.

In operation, the loader-unloader takes the cans from the closing machine by means of an elevator and cableway. Then they move directly to rotating perforated disks in the retort. After these disks are loaded, the retort is closed and the canned food is cooked and cooled therein.

By rotating the disks in the retort, the cooking time is reduced. Also by rotation, time in cooling is saved, since the rotation improves heat transfer. At the conclusion of the cooling cycle, the retort is opened, and the cans are discharged from the disks into another runway and conveyed directly to the labeling machine or boxer in the warehouse.

This method eliminates the following four steps: Placement of the cans into the crate, moving loaded crate into cookroom, placing crates in a cooling canal and draining them, and unloading crates into the warehouse. Elimination of these operations brings the aforesaid saving of 7 to 11 men for each closing machine. With crates "out", space formerly given to their storage is conserved.

The closer control of the cooking process means a better product from the standpoint of both flavor and appearance. Cooling in the retort eliminates need for a canal, one of the prime sources of contamination. One other factor that improves the product control is the space between each tier of cans in the retort. This provides better circulation than does the present method of stacking cans "solid" in the retort crates.—*Berlin Chapman Co., Berlin, Wis.*



Sanitation Accented In New Motor

For use where strict sanitation is required, a specially designed electric motor has been developed.

Totally enclosed, it can be "hosed down", has a sealed

terminal box, and there are no crevices in which water or contaminants can lodge. It is made with protected screening to splash-proof specification.

Performance and temperature characteristics of the motor meet NEMA standards and exceed the minimum specifications of sanitarians and 3 A standards.

It has been designed particularly for service in dairies, milk plants, wineries, and bakeries.

The motor embodies machined flush joints, universal mounting, adjustable terminal box, rotary water seal, asbestos-protected windings, normalized castings and a centricast rotor. Power range is from ½ to 7½ hp.

Exterior is finished in corrosion- and abrasion-resistant baked white enamel. Fittings and screws are also resistant. Streamlined surface lends itself to hosing and utmost cleanliness.—*U. S. Electrical Motors, Inc.,* 200 *East Slauson Ave., Los Angeles* 54.

Hand Refractometer Gives Quick Analysis

Designed especially for fruit and vegetable growers and processors, a new pocket-size refractometer, now in production, is called by its maker the most accurate hand type unit on the market today.

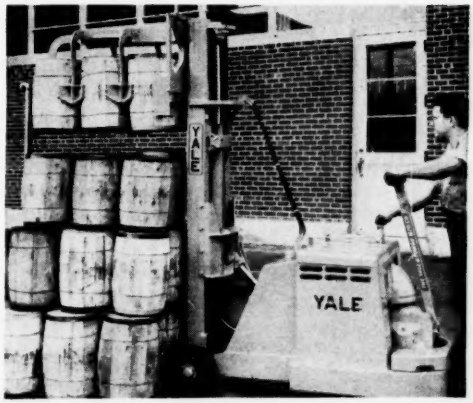
Instrument is unique in having facilities for reading total dissolved solids content directly to 0.1 percent with either transmitted or reflected light.

On-the-spot inspection to determine the quality of fruits and vegetables during the ripening stage, or of juices and beverages before or after canning or bottling, may be made over a range of 0 to 25 percent. "Transmitted light affords best results with clear or transparent solutions, while reflected light is usually required for readings of turbid samples," according to the optical firm.

The new instrument has a wide-aperture focusing eyepiece to accommodate the user's eyes, and a precise, easy-to-read scale. Alternated across the center, the scale lines have even tenths on one side and odd on the other. An orange colored background makes for greater eye comfort and more precise readings.

Its built-in temperature correction thermometer is graduated in percentage of total dissolved solids. Thus there need be no reference to correction tables when temperatures other than the standard 20 deg. C. are present.

A neck chain is provided for catching the instrument if dropped during use. To reduce maintenance costs, movable parts of the prism assembly are designed to avoid damage to the glass prisms.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.*



Kegs and Drums Handled Without Pallets

Battery-powered hand-trucks can now be equipped with hydraulically operated fingers which grasp and pick up drums, cylindrical cardboard containers, and kegs without the use of pallets or skids.

From 1 to 6 containers, 2-, 3-, and 4-layers deep, can be tiered. Fingers grasp the load from above and suspend it for handling, rather than support it from below.

The truck is advantageous when loading and unloading freight cars and street trucks, because containers do not have to be manually placed on or taken off pallets or skids.

Hand truck weighs 3,845 lb., its overall height is 83 in., and its outside dimensions are 32⅜ x 77½ in., excluding grasping mechanism. Operation of the hydraulic fingers and lifting and lowering are controlled by levers located at the front of the truck.

Forward and reverse speeds are controlled from the handle of the truck. When the steering handle is in either the vertical or horizontal position, the truck brake is automatically applied to prevent accidental movement.—*The Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia* 24. (*Food Equipment Continued*)

DON'T MISS THESE . . .

Tank car fitting for unloading universal tank cars can be hooked up in less than one minute..Page 108

Sheet dough is reversed in new molder-panner which utilizes Teflon rolls.....Page 110

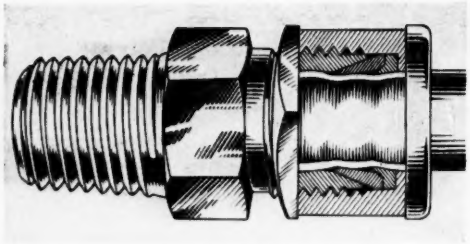
Chemical feeder has all its working parts encased in transparent plastic.....Page 111

Fold this hand truck when it is not being used and save space. It opens like an accordion.....Page 112

AND WATCH FOR . . .

New hydrostatic gage—simple, sturdy, dial-type unit for use with milk and ice cream tanks..In January FI

Time-saving filter that cleans itself by automatic sluicing of filter cake.....In January FI



Tube Fittings Effect Triple Seal

For use with any type of metal or plastic tubing, a new clinch-type fitting has been developed.

Known as "Swagelok", these new fittings provide leak-proof seals at three points. Two ferrules and a threaded chuck clamp around a tube with virtually no effect on the inner walls, leaving the flow of liquids or gases completely unimpeded. Tests have indicated that tubing will burst before the fittings themselves will leak. Also, the fittings lend axial support to a tube assembly, tending to drive vibration away from fitting and in this manner minimizing fatigue.

Assembly operations are also aided by the design of the fittings. No flaring or other time-consuming preparations of tubing is required. Fitting is simply slipped onto end of tube and given one-and-one-quarter turns with any standard wrench. Resulting assembly is then ready for service. No damaging torque or twisting is transmitted to tube during this brief tightening operation.

These fittings may be had in Monel, brass, aluminum, steel and stainless steel, Types 303 to 316. Connectors, unions, elbows and "tees" are all being produced, in a range of sizes that permits their use with tubing $\frac{1}{8}$ to 1 in. in outside dia.—*Crawford Fitting Co., Cleveland* 17.

Smokehouse Door With Many Advantages

A new all-steel smokehouse door, with a 3-point fastener and inside release handle, has been developed. Up to now, the door has been available only when called for on a custom order.

It is stated that the door will provide excellent performance and years of trouble-free operation regardless of the design of the smokehouse in which it is installed. It is heavy and rugged, yet easily operated and efficient in establishing a smoke-tight seal.

Advantages of the door are due to several exclusive features:

The smoke-tight seal is secured by thermo seal gasket plus three-point interconnected fastener, which provides strong, uniform closing pressure at center, top, and bottom of door. Individual fasteners operate simultaneously, eliminating lag in closing.

Safety feature is inside release handle eliminating need for emergency window.

Overall design and structure withstands warping effect of smokehouse temperatures. Front and back are each die-formed from a single, heavy No. 12 gage galvanized steel sheet.

All seams and joints are welded, adding structural strength and eliminating need for internal bracing.

Insulation is of heavy-density Fiberglas and is continuous.

Heat resistant gasket is especially fabricated for smokehouse use. Though tough, it is pliable and resilient. It is cemented into a continuous protected recess at top, bottom, and side edges of door, and seats against adjustable sealing bars, so that the door is easily adjusted for gasket wear. All hardware was designed for use on smokehouse door. Hinges are of heavy forged steel strap.—*Jamison Cold Storage Door Co., Hagerstown, Md.*

Insecticide Sprayer Has Automatic Timing

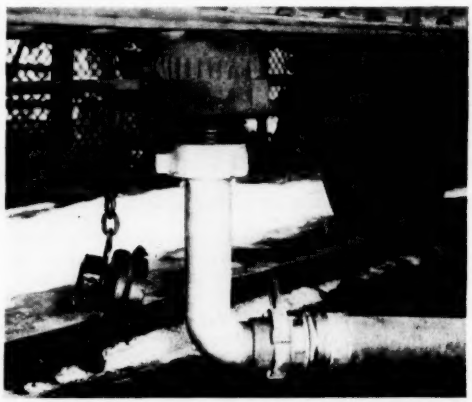
Insecticides are dispensed in a fog spray by a new portable unit known as the "Super Mistorizer".

It consists of three component parts—a $\frac{1}{2}$-hp. compressor unit, a 3 gal. insecticide tank, and a pressure feed-type hand-operated spray gun. The unit is mounted on a solidly built two-wheeled cart.

Need for local auxiliary air, steam, or other driving power, is eliminated by dispenser's own compressor. Equipping the unit with a special hand-operated spray gun provides further advantages for multi-purpose insecticide dispensing.

Sprayer's two-nozzle head is designed to convert the company's insecticide fluid into a "dry" mist of insect-killing droplets. When used according to directions, the unit will turn out particles of fluid so small that they will not condense on, or wet, tables, walls, or equipment.

Featuring an automatic one hour interval timer, the sprayer will fog 10,000 cu. ft. in five minutes. It handles areas up to 50,000 cu. ft. without having to be moved to a new location. One filling of the unit is sufficient to completely fog 250,000 cu. ft. of space.—*West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.*



Tank Car Fitting Readily Attached

A new unloading fitting for universal tank car use has been announced. It weighs less than 10 lb.

Principal advantage of the new fitting is said to be the ease of handling and speed of hook-up. The operation requires less than one minute. One man can easily lift the fitting in place and tighten the collar by hand. Need for heavy pipe wrenches and the fatiguing lifting formerly required are eliminated.

Made from cast aluminum, the fitting has a high tensile strength to withstand hard usage. And it successfully meets rigid tests for handling liquids under most pressures and conditions.

It is available in lengths of 10 and 15 in. A standard thread is used in the fitting collar for universal adaptability on all tank cars. An undercut in the collar locks the oil-proof gasket in place to prevent loss or damage. The collar always stays up in position ready for immediate use. —*The Mead Cornell & Co., P. O. Box 2682, Cleveland 7.*

He's got the WORDS...We have the FACTS!

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the powerful all-purpose germ-killer

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Laboratory-Perfected

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MILK • BUTTER • CREAM • ICE CREAM • CHEESE
SUGAR • EGGS • FISH • MEAT PRODUCTS
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Yes, without exaggeration, here's the many-in-one germ-killer you've been looking for! A quaternary ammonium compound that does most every cleaning job *better* and *faster*. West Teramine thoroughly sanitizes, cleans and disinfects all kinds of food equipment *without leaving an ODOR*. Does the same for walls, surfaces, floors and washrooms. Kills bacteria, molds and fungi *everywhere*.

IT'S "SURFACE-ACTIVE"

West Teramine is more powerful—has extra penetrating power because it's faster-wetting and "surface-active." More versatile—a slight change of dilution adapts it to any need. More economical—a little goes a very long way. In recommended dilutions, West Teramine is non-poisonous, tasteless, and won't irritate the skin.

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See Teramine in action! Learn why the entire food industry is sold on it. You'll be sold *too* after one demonstration.

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Company_____
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CASE HISTORY #3

The.....Co., nationally known food manufacturers, phoned Edlaw: Have Export Order for one million Cans Soup Mix—Deadline shipping date—Hot weather stopped our packaging line!

Have you air-conditioned plant? High speed filling equipment? Automatic can closing? Labeling machine? Can you take over this order and deliver on time? Will costs be in line?

All questions answered "yes"! Bulk material and supplies were started in — and finished cases were rolling out —on schedule— as promised!

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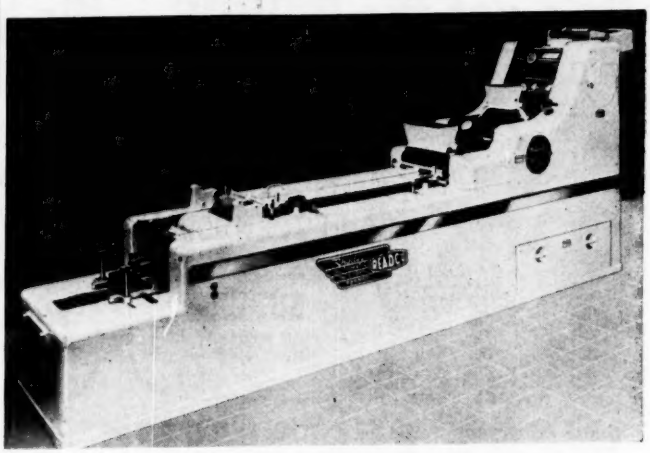


Sheet Dough Reversed In Molder-Panner

Operating on an entirely new principle, a new molder-panner machine uses three sets of sheeting rolls and a flip-over device to reverse the dough piece after the second sheeting stage.

Thus, the leading edge of the dough piece becomes the desirable "wet end" and is curled into the center of the loaf. This develops a finer texture, better flavor, and keeps the loaf fresher for a longer period. Speed of machine is adjustable to suit any condition.

Two sets of Teflon rolls are used to pre-sheet the dough piece. With these rolls, there is no tight fit of scrapers to heat the rolls and in turn raise the temperature in the dough pieces. Little or no dusting flour is required, since dough does not adhere to Teflon. This eliminates flour cores and produces a finer texture in the loaf, also reduces costs of dusting flour. Sheeting rolls are adjustable.

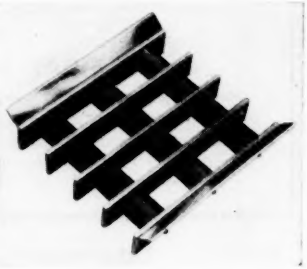
Reversing the sheeted dough piece is an entirely new process. Completely controlled handling of the pre-sheeted dough piece is accomplished through a reversing mechanism in which the piece is completely turned over and the trailing edge becomes the leading edge.

The reversed dough passes through a third set of Teflon rolls for final sheeting, during which the moisture is partially redistributed throughout the dough piece. This final sheeting process assures controlled entry of the piece beneath the power-driven curling mat.

The power-driven mat is reported to permit a new degree of control over the curling process. It is stated that it will curl a thinner, longer sheet of dough with more curls, thus expelling air pockets and producing a finer texture and grain. The "wet" end of the dough piece is curled, as previously stated, into the center of the loaf to give a better moisture control.

New unit is extremely flexible. It will handle dough pieces ranging from 12 oz. to 3 lb. in weight and deliver molded loaves from 6 to 16 in. in length. Speed is consistent with high speed overhead proofers.

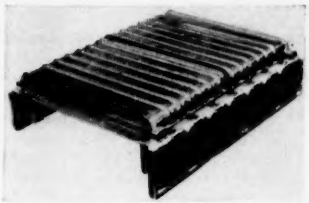
All lubrication points and drive assembly are easily accessible. Net weight is 4,085 lb.; shipping weight, 4,385 lb.—*Read Machinery Div., of the Standard Stoker Co. Inc., York, Pa.*



Grate-Separator Traps Magnetic Materials

A new—and different—permanent magnet separator is applicable to the handling of coffee, tea, spice, grains, nuts, beans, and other flowable materials of sufficient fineness to go through its special grate.

The grate (see photo) comprises magnetized Alnico bars and iron spacers. Angular side supports are so designed that the grate can be laid in the bottom of a hopper or a floor



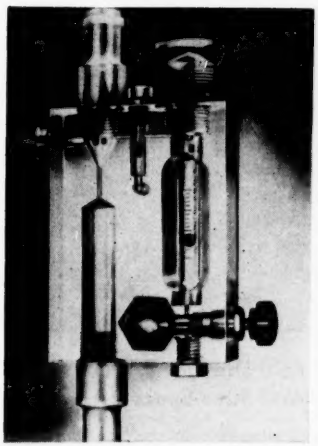
Folding Carrier Saves Space

Up to 66 percent of the space ordinarily required is saved by this collapsible carrier-box. It is readily set up or knocked down, and is easily handled with fork truck. Boxes are available in various sizes. *—Truscon Steel Co., Youngstown 1, Ohio.*

opening, and can be readily lifted out for cleaning.

Not shown in the illustration is a wire grid which overhangs the grate. Rods in this grid are spaced midway between the magnetic bars to deflect material and cause streams to wipe the bars.

In addition to attracting ferrous pieces and particles, the grate catches sticks, straws, paper, and other foreign non-magnetic materials. Magnetic grates are made to fit all sizes of openings from 8-in.-sq. up.—*Bauer Bros. Co.*, 1740 *Sheridan Ave., Springfield, Ohio.*



Chemical Feeder Encased In Transparent Plastic

Relatively small amounts of bacteri-cides, catalysts, disinfectants, fungi-cides, inhibitors, reagents, and other chemicals, are simultaneously con-trolled, metered and dispensed by a

(Food Equipment Continued)

★ Uniformly neat wraps ★

for metal-end fibre cans

Packers are aware that metal-end fibre cans offer important advantages for packaging certain types of frozen foods... For example, cans permit the use of high speed automatic filling and closing equipment. The problem has been to supply a satisfactory over-wrap ECONOMICALLY. And that's where our Model FF Frozen Food Wrapper comes in!

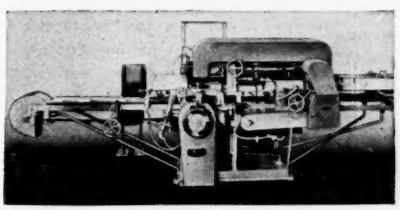
The FF overcomes the obstacle presented by the recessed ends of these sturdy containers... Provides colorful, eye-catching wraps at a speed of better than 100 packages per minute. Moreover, this same machine also wraps cartons, thereby enabling you to maintain a uniform appearance for your entire pack.

Wrappers can be applied to cartons either before or after the contents are frozen—the FF automatically makes allowances for slight variations in the width of packages caused by freezing. And the end-seal made on the fibre can allows moisture to escape—thus assuring an equally attractive wrap whether the surface of the container is wet, frosted, or dry.

Virtually any plain or printed wrapping material may be used. A "letter-perfect" electric eye device registers printed wrappers with unfailing accuracy.

Get complete facts on the Model FF—the fastest-selling of all frozen food wrappers.

Write or phone our nearest office today



Model FF Frozen Food Wrapper

PACKAGE MACHINERY COMPANY

SPRINGFIELD 7, MASSACHUSETTS

NEW YORK · CHICAGO · BOSTON · CLEVELAND · ATLANTA · DALLAS
DENVER · LOS ANGELES · SAN FRANCISCO · SEATTLE · TORONTO · MEXICO, D.F.

You can MOVE IT FASTER...
BETTER...
and at LOWER COST...

on a FINGERPRINT ENGINEERED

CONVEYING SYSTEM

Cost-conscious management, these days, is giving increased attention to the movement of goods and materials. Frequently changes suggested by Alvey-St. Louis engineers have resulted in real economies... in increased production... Want to know the reason why? From their years of experience Alvey-St. Louis engineers know that just like fingerprints, no two plants are identical. Each problem, therefore, is given individual study and attention... what we call Fingerprint Engineering. Without obligation, why don't you investigate what an Alvey-St. Louis engineered conveying system man can do for you? Detailed catalog will be sent on request.

new compact, self-contained chemical feeder.

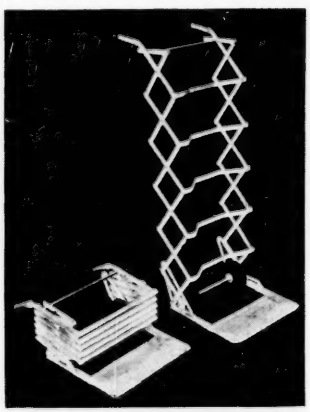
Known as the "Feed-Rator", it is made of transparent acrylic plastic. It measures about 10x5x2 in. overall.

The built-in eductor takes the place of a pump, and many highly corrosive chemicals can therefore be fed directly from a container.

In operation, the main-stream line is connected to the eductor at the top of the plastic block. Flow through the eductor creates a partial vacuum on the reagent side. This vacuum induces a flow of reagent through the needle control valve, through the metering tube, and into chamber where thorough mixing takes place.

Reagent flow rate is accurately controlled by the built-in needle valve, and indicated by the float. A ball check valve is provided to prevent flow of main-stream liquid into the reagent line on shut down. For use in gas service, a vacuum breaker is provided.

The unit will directly treat up to 700 gal. of water per day. In a by-pass arrangement, using a solution containing 5 percent active reagent by weight, 5 ppm. of reagent can be delivered to over 14,000,000 gal./day.—*Fischer & Porter Co., Hatboro, Pa.*

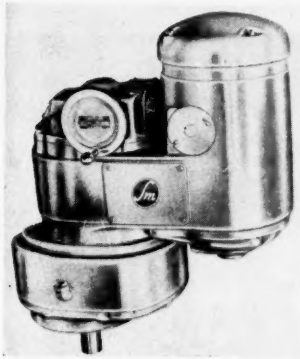


Fold the Hand Truck And Save Space

When not in use, this new hand truck occupies a minimum of space. It can be placed out of sight, under counters, truck seats, or shelves.

Known as "Bestype Fold-A-Way", it pulls open like an accordion to its full height of 42 in. This opening is an easy lifting motion. Loaded, the truck can carry up to 700 lb., though it weighs only 25 lb. itself.

When a number of these hand trucks



VS Motor Is Vertical Mounted

Herringbone rotor, labyrinth seals, heavy duty ball bearings, and streamlined case are incorporated in the new "Speed-Trol" vertical mounted motor. Infinite speed adjustment is available through fingertip control with large easy-to-read indicator.—*Sterling Electric Motors Inc., 5401 Anaheim-Telegraph Road, Los Angeles 22.*

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are needed, they can be stacked so that ten of them can be stored in the space formerly required for two of the rigid type. Two notable features are the glider bar, which makes it easy to take a load up or down stairs, and the rubber wheels, which are placed inside the frame to eliminate danger of catching passing objects.

Units are available in two models—straight back for most packages, and round back for barrels and kegs. Truck is of all-steel construction, with heavy duty oil-less bearing wheels made of rubber.—*Business Equipment Specialists, 10 W. 44th St., New York 18, N. Y.*

Multi-Purpose Stand Is Readily Cleaned

Easy cleaning and high sanitation are featured in the redesigned No. 1-C Multi-Purpose Stand used for mounting of coating and polishing pans.

Built for heavy duty, trouble-free operation, the new stand carries pans up to 42 in. dia., either steam-heated or standard. Angle of support is adjustable for operator convenience or work requirements.

A new type gear box prevents abrasive materials from reaching the gear train. And oil cannot seep outside this box. A heavy-duty upper bearing carries most of the load, taking both axial and radial thrusts.—*F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia 20.*

(Food Equipment Continued)

SPECIALTY
PRODUCTS

Meet all requirements

and then some!

SPECIALTY
Sanitary
Centrifugal Pumps

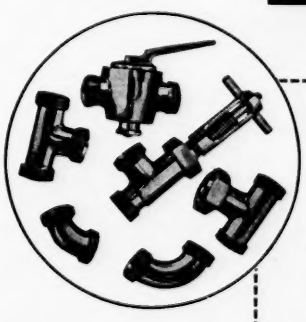
Peak performance is the prime purpose of these precision-built centrifugal pumps . . . outstandingly efficient units for food processors. Moving syrups—or other semi-liquids—becomes a cinch because of the three-bladed single piece impeller that won't cause churning or foaming. Beautifully designed, completely sanitary, easy to take apart and clean-up. Ask for interesting Nofome and Streamflo Pump Bulletin 9C.

Sanitary Product-Handling Equipment is a* SPECIALTY *Business

SPECIALTY BRASS COMPANY
Kenosha • Wisconsin

You can "feel" the built-in superiority of SPECIALTY Sanitary Valves and Fittings. Every detail is precisely machined and highly polished to an exacting finish. That's why take-down and clean-up time are a snap. Made from stainless steel or nickel alloy to meet rigid code requirements. Specify SPECIALTY . . . over forty years the leading source of sanitary fittings. Complete details in Catalog 2FB.

SPECIALTY
Sanitary FITTINGS



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MAIL COUPON NOW

SPECIALTY BRASS COMPANY
Kenosha, Wisconsin

Gentlemen: Please send additional information on items checked below

☐ Sanitary Pumps ☐ Pre-Heaters & Pasteurizers
☐ Sanitary Fittings ☐ Stainless Steel Tubing
☐ Surface Coolers ☐ Economy Filters
☐ Milk Bottle Fillers & Cappers

Name.....

Address.....

City..... Zone..... State.....

NOTHING lost.... NOTHING added

Alva True Fruit
CONCENTRATES

are dependable—composed entirely of the flavor constituents from the fruit itself—Nothing lost—Nothing added. Unique extraction techniques and newly developed processing equipment retain the delicate, volatile top notes, so often lost in conventional processing and assure you of the finest in natural flavor. Outstanding in the complete ALVA line of True Fruit flavors are

Raspberry
Strawberry
Grape

— adaptable for every true fruit flavor use.

Many foods can not be suitably and economically flavored by true fruit alone. In such cases the complete and popular line of "ALVA True Fruit Extracts with Other Natural Flavors" is usually the answer.

For your special problem we offer the services of our unmatched flavor laboratories and research facilities to determine the RIGHT flavor for the particular product.

A

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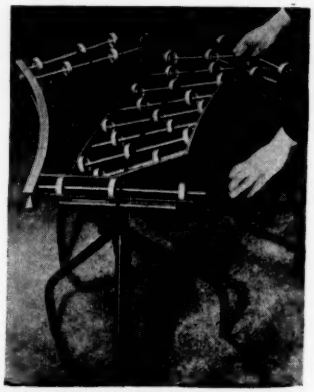
315 FOURTH AVENUE



Switches Product Flow

To direct flow of materials from one single line into two lines, the operator has simply to flip the center section of a new switch to change direction. Unit is available, with wheels or rollers, for use with 12, 14, 18, and 24 in. conveyors.—*Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y.*

Equipment Briefs

Self Locking Nut

Positive locking, exact adjustment, and speed of application are important features of a new patented locknut. It consists of a standard steel nut and a slightly elliptical retainer ring combined in a single unit. Used like an ordinary nut, it locks in any position on threaded part.—*Security Locknut Corp., 1815 N. Long Ave., Chicago 39.*

Cold Pipe Insulation

Standard pipes and fittings can now be covered with a specially light weight insulation. Known as "K-Shield", it is made of Styrofoam, an expanded plastic containing thousands of minute closed-wall cells. Recommended for temperature ranges between 175 deg. F. above and 250 deg. F. below, it resists mold growth, rot, and moisture-vapor.—*Robinson Industries, Coleman, Mich.*

Battery Cell Filler

Maintenance men can quickly, accurately, and easily add water to storage batteries used in electrical industrial trucks with an improved cell-filler. It consists of a tube with nozzle and a handle equipped with a valve operated by finger-tip control. At handle end, an electric signal lamp flashes when water in cell reaches correct level.—*The Electric Storage Battery Co., 19th St. & Allegheny Ave., Philadelphia 32.*

Cleaning Compound

For removal of vegetable, fish and animal oils and fats from food handling and processing equipment, a new cleaning compound is announced called "Pow'r'd Kol." It was developed for speed effectiveness at relatively low temps and controlled alkalinity. Maker odorless, non-foaming and stable ater.—*The Du Bois Co., 1120 W. Cincinnati.*

—*End*

PROBLEM?

WRITE, WIRE, OR PHONE

UNITED

***We are ready to show you why it pays to package with* UNITED.**

CARTONS: All types of folding cartons
Specialty cartons
Foil cartons
Display cartons
Bottle carriers
Greaseproof bakery cartons
Stock cake cartons

Complete folding carton facilities—
designed for any purpose

BOARD: All types of folding board
Foil Laminated board
Greaseproof Laminated board

UNITED BOARD & CARTON CORPORATION

Folding Cartons and Package Specialties • From Pulp to Finished Product

P. O. BOX 1318, SYRACUSE, NEW YORK

CARTON PLANTS: VICTORY MILLS, SYRACUSE, COHOES, BROOKLYN, N. Y. SPRINGFIELD, O.; BOARD MILLS: LOCKPORT, THOMSON, N. Y., URBANA, O.

New Packages and Products

Dressing Sold In Antique Apothecary Jars

Tradenamed "55," and supplied in an attractive 8-oz. apothecary bottle, a new French dressing has been introduced to the New York City area. A bland blend of corn oil, vinegar, mustard, salt, sugar, pepper and garlic, this product is recommended for use on greens, fish or fruit.

The maker, 55 Products company, Brooklyn, N. Y., decided to use the hand-blown apothecary bottle with the ground glass stopper as a gift item which would make a pleasing appearance on the dinner table. And it is reported to pay off—selling well in the specialty stores.

The simply designed label is easily removed. Refills of the dressing are also available in standard, square, glass bottles closed with a plastic cap.

Street number of the manufacturer—55—supplied the name of the product, and miniature models of the front of producer's home are used in the displays of the dressing.

New ¼-lb. Prints of Margarine

Oleomargarine, colored yellow and aluminum-foil wrapped in ¼ lb. sections, has recently been introduced by Standard Brands, Inc., in the California market.

This new style package is aimed to appeal to the housewife by eliminating the bother of home coloring, and by assuring a fresh-flavored product.

To meet the expected western demand, the company has erected a new plant adjoining its Fleischmann Yeast unit in Oakland.

The aluminum-foil wrap, made by Reynolds Metals, Richmond, Va., was tested extensively in the manufacturer's Indianapolis laboratories. And it is reported to have scored high in protecting the margarine's flavor and in guarding against penetration of refrigerator or store odors.

Plastic Bags for Prepackaged Produce

Along with the growing trend to prepackaging of fruits and vegetables have come some novel transparent containers. Latest innovation for bulky products like oranges, apples, potatoes and onions are the "Snap-Sacks" made by Shellmar Products Corp., Mount Vernon, Ohio, and South Gate, Calif.

The pack consists of a conventional square-style FF Pliofilm bag with an elastic band sewed into its top. The elastic permits the bag to be opened to its full capacity for loading, and, when filled, contracts to make an adequate closure. A small opening remains to provide ventilation and easy access to the contents.

Full visibility for inspection of contents is a big selling point to shoppers. And even when the bag is inverted (as illustrated above) the fruit will "stay put."

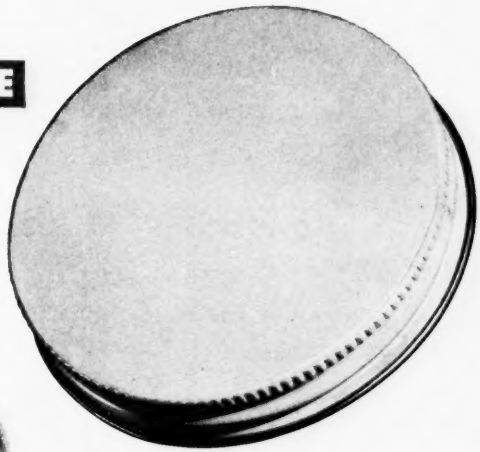
Fruits now reaching the market in these sacks include oranges packed by Granada Packing House, Anaheim, Calif.; apples by American Fruit Growers, Inc., Hagerstown, Md., and by Cowiche Growers, Inc., Cowiche, Wash.

Special adaptations of the Ahlberg filler head by Food Machinery & Chemical Co. have made utilization of the new bags an easy matter on the filling line.

(Packages and Products Cont'd)

Which cap would you choose?

BEFORE



AFTER

IF YOU WANT your product to really move on store shelves, you'll choose the cap with the colorful, lithographed design. Because, you know, cap design is part of package design . . . and good package design moves goods. This "before and after" illustration is just an example of how Armstrong's experienced package designers can put life into a blank metal cap. An eye-appealing design in color that costs only a fraction of a cent per cap extra. If your sales need a shot in the arm, take another look at your present cap designs. For suggestions for improvement, send a sample of your present package and pertinent market data to Armstrong Cork Company, Glass and Closure Division, 4212 Prince Street, Lancaster, Pennsylvania.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

Have you discovered the economy of INGACLAD?

If you need stainless steel for protection only on the exposed or contact side, you probably don't need *solid* stainless. And that's where IngAclad can cut your costs, save you money!

IngAclad helps you stretch your budget because it consists of a 20% cladding of stainless steel permanently bonded to a backing of carbon steel. That means 100% stainless protection on the contact side at much less cost.

You save on production costs, too, because IngAclad is easier to form.

We also produce Solid Stainless and Heat-resisting Alloy Steels.

ENGINEERING B-W PRODUCTION

INGERSOLL Steel Division
Borg-Warner Corporation
310 South Michigan Avenue, Chicago 4, Illinois
Plants: Chicago, Illinois • New Castle, Indiana • Kalamazoo, Michigan

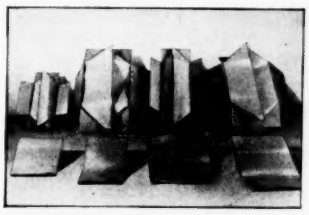
Beet Sugar in New Roles

A complete line of packaged sugars was recently introduced by Spreckels Sugar Co., San Francisco. This firm is now credited with being the first beet sugar producer on the West Coast to offer the retail trade "specialty" sugars as well as the granulated product.

Many months of experimenting, testing and market research preceded the development of the new packages. Each product is individually identified by its own distinctive color shade.

The box of confectioners powdered sugar is colored blue and white; the box of golden brown sugar is in two shades of brown and white; the package of instant dissolving superfine is in green and white; and the cubes in red and white. In addition, the company's regular 5 lb. and 10 lb. bags of fine granulated sugar will be "dressed-up" in similar two-tone color designs.

The distribution is limited to the Western states.



Plastic-Coated Paper Liners

Polyethylene-coated papers are being supplied for liners of various sized corrugated boxes by W. Ralston & Co., Inc., Old Bridge, N. J. The plastic, polyethylene, imparts many advantages to coated papers, since it is odorless, tasteless, non-toxic, acid-resistant, chemically-inert, moisture proof and can be heat sealed. It also remains flexible at low temperatures.

These new papers are reported offered at a low cost as a result of economical manufacturing operations. The firm employs a supporting paper as a backing to the plastic so as to use less weight of film.

The new product is being utilized in bag and barrel liners in both flat and creped forms. It can likewise be employed as a protective covering for outside storage.

Rum Fruit Cake

A new package of mellowed-in-rum fruit cake has been introduced by the Kroger Co., Cincinnati.

The delicacy comes in a flat, circular can holding a net weight of 2½ lb. Label is bright red with white lettering, and a realistic picture of the cake shows off the fruit and nuts.

Ingredients inelude: Sugar, eggs, glaced cherries, hydrogenated shortening, candied citron, rum pecans, almonds, lemon peel, bleached raisins, flour, glaced pineapple, salt, natural and artificial flavors, and spices.

(Packages and Products Cont'd)

In safety circles everywhere Flex-a-Foam Filter Masks are making news, because here for the first time is a respirator that workers really welcome and wear—without the usual prodding from supervision. Look at these unusual features:

1. **It's light and easy to wear—weighs only 1 ounce, fits any size face with comfortable snugness.**
2. **It's *easier* to breathe and talk through than an ordinary linen handkerchief.**
3. **It's exclusive method of headband adjustment keeps mask snug and comfortable—without tension or hair pulling.**
4. **It's so smartly styled that workers don't look or feel peculiar, and are no longer the brunt of jokes.**
5. **It's low in cost, low in upkeep—easy to clean and keep clean.**

FLEX-a-FOAM'S filter is a honeycomb of whipped foam latex that *keeps out non-toxic nuisance dusts as small as 1/25000 of an inch.* Positive-locking molded plastic frames are so flexible they adjust themselves to every wearer's facial contours, yet so tough they're unbreakable in normal usage.

For the utmost in comfort, efficiency and economy, treat your workers to Flex-a-Foam Filter Masks—lowest priced *quality* respirator ever made.

Attention Agents and Jobbers
Your interest is invited

The Goggle Parts Company — Dept. C
Cleveland 13, Ohio
Please send full information and prices on Flex-a-Foam Filter Masks.

Name_____
Position_____
Company_____
Address_____
City_____ Zone_____ State_____

THE GOGGLE PARTS COMPANY
CLEVELAND 13, OHIO

Only $2.98 helps put new "sell" in television advertising

Sponsor of television show had to refilm his commercials to meet a new selling problem. New films picked up at studio 4 P.M., delivered to TV station 800 miles away 8:47 P.M. same evening. Air Express cost for 11-lb. carton, $2.98. (In *undramatic* fashion Air Express keeps radio, television or any business rolling.)

Remember, $2.98 bought a complete service in Air Express. Rates include door-to-door service and receipt for shipment—plus the speed of the *world's fastest* shipping service.

Every Scheduled Airline carries Air Express. Frequent service—air speeds up to 5 miles a minute! Direct by air to 1300 cities; fastest air-rail to 22,000 off-airline offices. Use it regularly!

Only Air Express gives you all these advantages

Nationwide pick-up and delivery *at no extra cost* in principal towns, cities.

One-carrier responsibility *all the way;* valuation coverage up to $50 without extra charge. And shipments always *keep moving.*

Most experience. More than 25 million shipments handled by Air Express.

Direct by air to 1300 cities, air-rail to 22,000 off-airline offices.

These advantages make Air Express your best air shipping buy. Specify and use it regularly. For fastest shipping action phone Air Express Division, Railway Express Agency. (Many low commodity rates in effect. Investigate.)

SPECIFY AIR EXPRESS
AIR EXPRESS
GETS THERE FIRST

Rates include special pick-up and delivery door to door in principal towns and cities

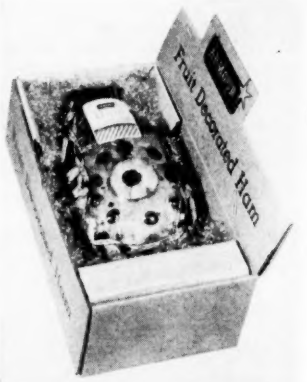
AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE SCHEDULED AIRLINES OF THE U.S.

Colored Carton Ups Wine Sales

Colorful printed display containers are being used by Taylor Wine Co., Hammondsport, N. Y., to ship its complete line of beverages. And business is reported to have increased over 20 percent during the first five months the new packaging was used.

The unique cartons are made from liner board which is first printed in an over-all decorative pattern of grapes and leaves, wine glasses and bottles. The colors used—golden buff, wine, light and dark green—suggest the kinds of grapes from which the wines are made. Descriptive copy is then printed on the board in black and another color, different for each type of wine enclosed.

Robert Gair Co., Inc., N. Y., manufactures the packages.



Holiday-Wrapped Hams

Fruit-decorated hams, each wrapped in cellophane carrying a colorful evergreen and ribbon design and individually boxed, comprise an attractive Christmas promotion of Armour & Company.

Since hams will be quite plentiful in

(Packages and Products Cont'd)

FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

$127.50 Monthly Profit from Orange Oil Formerly Lost

(reported by J-M Engineer H. G. Martin)

LOS ANGELES DISTRICT: A citrus processor in my territory uses high-speed centrifuges for orange oil recovery. After two weeks' operation, there is an accumulation of about 100 gallons of sludge, which has a high content of orange oil. Settling and decanting this sludge yields 75 gallons of oil. By adding Celite to the remaining 25 gallons of heavy sludge formerly discarded and then pressing it, 5 more gallons of orange oil are recovered. Selling for $1.50 per pound, this means a saving of $130.00 in additional orange oil per month. Deducting $2.50 for the cost of Celite used, the operation shows a monthly net profit of $127.50.

Sales Appeal Improved with Celite 545

(reported by J-M Eng. W. A. Reschke)

CHICAGO DISTRICT: A trial run convinced this customer that he had much to gain and nothing to lose by using Celite as a pressing aid in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Previously, without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. Customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a considerably longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite 545 to each 900-lb. batch of grapes pressed.

Filter Trouble Corrected with Hyflo*

(reported by J-M Engineer R. J. Amberg)

DETROIT DISTRICT: A wine company reported trouble with a new filter which they had installed recently and I was called in to assist.

The problem was to handle the settlings from several thousand gallons of wine without increasing the amount of filter aid which they had been using. The wine is pumped from the main cask to a 260-gallon mixing tank and from there to the filter. There are no facilities for pre-coating with anything but unfiltered wine. We put ten pounds of Hyflo in 200 gallons of wine in the mixing tank and circulated this until clarity was obtained. This was a matter of only a few minutes. The clear filtrate was then turned to a receiving tank. The flow rate was estimated at 6 gallons per square foot of filter area per hour after filtering about 200 gallons.

*T. M. Reg. U. S. Pat. Off.

Engineering Help Solves Filtration Problem

(reported by J-M Engineer G. F. Huber)

BOSTON DISTRICT: One of my customers was having difficulty due to the filter powder coming through the ceramic filter medium. I checked the operation with their technical director and found that incomplete venting of the air from the filter body during precoating permitted air to remain trapped in the upper part of the filter. This prevented the precoat suspension from filling the filter and depositing an even coat upon the stone. As the filtration was continued, the liquid level in the filter rose and gradually displaced the air but meanwhile, of course, some filter aid passed through the stone.

I suggested complete air venting at the start of the precoating and installing a valve on the outlet side. This change in operation resulted in a decided improvement and, needless to say, the customer was greatly pleased.

Your New Problem may be an old one to the CELITE Engineer!

These case histories show not only what Celite Filter Aids can do but also how Johns-Manville Filtration Engineers can help you. Small, simple changes in equipment or technique often lead to big results because J-M Engineers combine scientific knowledge with wide practical experience on many filtration problems. In addition, they have access to the resources of the J-M Research Laboratory where modern filtering techniques and filter aids were developed.

For additional information, write Johns-Manville, Box 290, New York 16, New York.

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Processing of Sodium
Vitamin Mfgr.
Gunpowder Processing
Processing Plastics
Rocket Powder Processing

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supply, the packer intends to emphasize their desirability as gifts as well as good food buys.

The pineapple, cherry and clove decorations imbedded in the golden brown glaze of the cooked ham are appropriately displayed through a clear section of the wrapping.

The firm's Star brand smoked and ready to eat hams, as well as slab bacon, will also be gift-wrapped in a holly decorated parchment.

Syrup With Creole Background

Chocolate syrup containing pieces of fresh pecans is the latest offering by Elmer's Candy Co., New Orleans. This new chocolate delicacy is recommended for use on ice cream or as a cake topping.

Called Elmer's Gold Brick Nut Sundae Syrup, it is distributed through wholesalers and retailers coast-to-coast.

The syrup is packaged in a 1-lb. stippled-amber Duraglas container manufactured by Owens-Illinois Glass Co., which also supplies the lithographed metal closure.

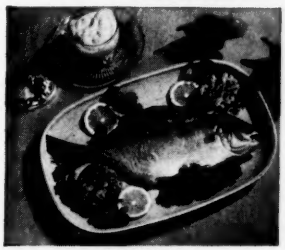
Elmer's has drawn upon the New Orleans "taste traditions" in creating many of its unusual products and uses native pecans in a number of its 50 varieties.

Stuffed Turkeys Foil-Wrapped

For holiday convenience, Shagroy Farms, Millerton, N. Y., is offering frozen turkeys, cleaned, stuffed with all "the fixings," and wrapped in heavy gage aluminum foil.

The busy host or hostess need only place the fowl, as is, into the oven and roast for a few hours. Remaining cloaked in the metal foil, the turkey is naturally basted by its own juices as it cooks. —*End*

IN SOUPS



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Staley's Monosodium Glutamate adds no color, taste, or aroma of its own—it simply magnifies the natural goodness in the foods in which it is used. As little as 0.05 to 0.5% by weight works miracles in canned soups, canned poultry, seasonings, sauces, and most other foods. It requires no formula changes . . . it's as easy to use as salt.

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A. E. STALEY MANUFACTURING CO.
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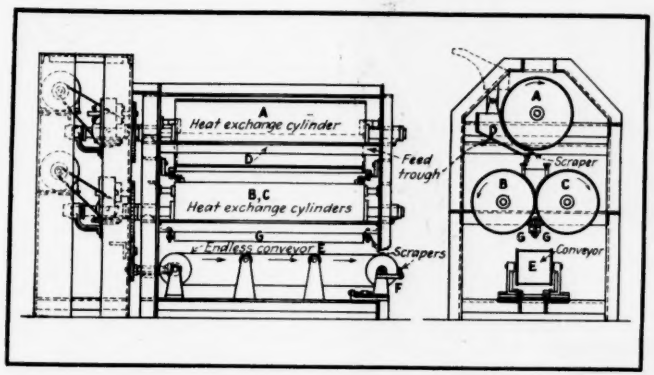

Cream Cooler Employs Heat-Exchange Cylinders

Quick cooling of high-butterfat cream, and cooling, thickening or freezing of other liquids of varying viscosities, is the purpose of a recently patented machine.

The apparatus consists of three heat-exchange cylinders rotatably mounted on a supporting frame (see illustration). A feed trough (D) extends along one side and below cylinder (A), and an endless conveyor runs under cylinders (B) and (C). One side and the end walls of the trough are provided with strips of compressible material that form a liquid-tight seal with cylinder (A)—and the side wall also acts as a scraper to remove the coating of partially cooled liquid from the cylinder. Top of the trough is open to receive liquid which should be maintained at a substantial level.

In operation, the cylinders are rotated (arrows show direction) by motors mounted in frame, cylinders are maintained at predetermined temperatures by circulating cooling media through them. The belt (E) is continuously operated to collect congealed or cooled products and deliver them over scraper blade (F) into storage or shipping containers.

When used for cream, the pasteurized product—at approximately 140 F. —may be fed directly into trough (D). As cylinder (A) rotates, its outer surface is coated with cream, which is carried upward and down on the right side until it is removed by the scraper-wall of trough (D). The cream then falls into the trough formed by cylinders (B) and (C). Bars (F) spread the cream evenly over the surfaces of these cylinders as they rotate in opposite directions. Scrapers (G) remove the congealed cream, causing it to drop onto conveyor (E) that delivers it over scraper (F) into storage or shipping receptacles. Temperature of 40-percent cream may be reduced from 140 to 90 F. on cylinder (A) and to 45 F. on cylinders (B) and (C).

All parts of the machine that come in contact with products being cooled are constructed of stainless or other readily cleaned materials. Trough and scrapers are easily removed to clean.

Digest from U. S. Patent 2,480,583, issued Aug. 30, 1949 on an application dated Mar. 4, 1946, to A. Johnson, Minneapolis, assigned to Land O'Lakes Creameries, Inc.

PACKAGING

Improved Can-Filling Of Foamy Liquids

Evaporated milk and other liquids having a tendency to foam are usually canned cold and more slowly than liquids not having that characteristic. This is particularly true with the so-called vent hole cans in which the small aperture serves both for escape of air and receipt of liquid. A recently patented process aims to overcome some of the objections—avoiding the accumulation of foam, more completely eliminating the air, speeding up the operation, and making possible the canning of such liquids while hot.

In a succession of operations, vent hole cans are preheated and then filled with steam injected at high velocity to drive out and replace the air, and there follows delivery to each can of a predetermined quantity of evaporated milk at a temperature of about 200 F. While the liquid is being delivered, the can is sealed against entry of air. Initially, the liquid condenses the steam and creates a partial vacuum, after which the entering liquid develops an absolute pressure substantially equaling that of the atmosphere on completion of the delivery. Thereupon, additional steam may be injected before applying solder to seal the can, or it may be sealed immediately after filling. In either case, there is substantially no entry of air through the vent hole, and a considerable vacuum exists in the can upon cooling.

Digest from U. S. Patent 2,477,692, issued Aug. 2, 1949, on an application dated Mar. 18, 1946, to Geo. Grindrod, Oconomowoc, Wis.

Package for Frozen Food Prevents Dehydration

In a patented carton for frozen foods, designed to prevent dehydration during storage, the inner face of the cover is provided with a water-absorbent pad of sufficient size to fold over the edges when the carton's cover is closed. When the carton is filled, the pad is saturated with water, which later forms an ice seal. And even though this sealing ice is later evaporated, the pad acts as a reservoir of moisture which will retard dehydration. The pad is preferably composed of multi-

(New Technology Continued)

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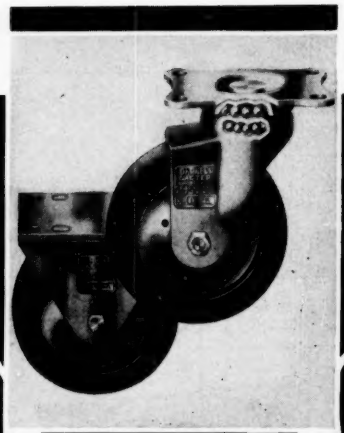

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ply crepe paper wadding laminated to a backing sheet of glassine that is glued to the inner face of the lid with a moisture-proof adhesive.

Digest from U. S. Patent 2,470,465, issued May 17, 1949, on an application dated July 26, 1946, to F. L. Broeren, G. E. Wanda and R. Kuehl, Neenah, Wis., and assigned to Marathon Corp., Rothschild, Wis.

BAKING

Baking Powder Residues Retard Fat Rancidity

All types of baking powders have antioxidant activity in bakery products in the presence of fats containing sufficient tocopherol. It is noted, however, that their effectiveness varies, being least for a combination of sodium aluminum sulphate and calcium acid phosphate, and greatest for pyrophosphate powder.

Accelerated storage tests were conducted on baked biscuits and muffins with different shortenings and leavening agents. Of the frozen products, those made with lard and combination powder had peroxide values of 4-6 after storage. All frozen baked quickbreads made with hydrogenated shortening, also those made with lard and pyrophosphate, had no more than a trace. Judges rated lard and lard plus NDGA biscuits made with pyrophosphate better in odor than those made with the combination powder. With muffins, all judges preferred the odor of pyrophosphate products, whether the fat used was lard or vegetable oil.

Digest from "The Effect of Baking Powder Residues on Rancidity," by B. M. Watts, B. Lehmann and F. Goodrich, *The Journal of the American Oil Chemists' Society*, 481-84, Sept., 1949.

FATS AND OILS

Atmospheric Oxygen Bleaches Dark Fats

A novel method has been discovered and patented for bleaching dark-colored, low-grade tallows, fats and greases by treatment with an acidic phosphorus compound and air, in the presence of an inhibitor of atmospheric darkening of the oil. Air or elemental oxygen can be substituted for compounds that liberate oxygen in the nascent state, thus greatly reducing the expense of the operation. The inhibitor may be any silicic acid or fluosilicic acid or one of their salts.

In practice, melted fat is mixed with a phosphoric acid compound and the silicon-containing inhibitor. Air is then blown through the mass, after which the stock is settled and a sludge

(New Technology Continued)

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THE BECKMAN "MODEL B" SPECTROPHOTOMETER

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Spectrophotometric measurements—based on analysis of liquid, solid or gaseous samples by light absorption—have become one of the most important methods of today's process control operations. Complicated analyses requiring hours to perform by standard chemical procedures are now completed in a matter of minutes using modern spectrophotometric methods.

Up to the present, *quality* instruments have been beyond the reach of many laboratories. Now, however, the development of the new Beckman Model "B" Spectrophotometer makes available for the first time a *precision* instrument—convenient and simple to operate—*yet versatile, accurate and low-priced.*

The Model "B" combines many of the advancements pioneered in the famous Beckman Quartz and Infrared Spectrophotometers . . . high resolution . . . wavelength and photometric accuracy . . . freedom from stray light . . . wide spectral range . . . quality construction.

It features direct reading absorbance and transmittance scales . . . complete elimination of stray light from 360 to 1000 millimicrons—less than 1½% even at 320 millimicrons . . . interchangeable phototubes for wider wavelength range . . . inexpensive sample cells . . . 4-position cell carriage for faster readings . . . and many other important features.

The Model "B" is by all standards the outstanding instrument in its field. Write for full details. *Beckman Instruments, National Technical Laboratories, South Pasadena, 18, Calif.*

MANY VALUABLE APPLICATIONS IN FOOD PROCESSING

The Beckman Model "B" has many valuable applications in food processing. It can be used to control the quality and uniformity of food products . . . to detect impurities, harmful spray residues, etc. . . . and to check the content of important nutritional elements.

In addition, the Model "B" simplifies color control of both solid and liquid products—flour, spices, sugar, baked goods, liquors, condensed milk, fruit juices, soups, catsup, vegetable and mineral oils, and a wide range of other food products—wherever "color" is essential to attractiveness and marketability. The Model "B" reduces color specifications to definite fixed values that can be accurately reproduced, run-after-run, month-after-month.

The Model "B" is also used for research into vital food problems, such as determining the condition of foods during cooking, freezing and other processing operations . . . studying the effects of storage on foods . . . and other similar analyses to advance food processing techniques.

Let our trained staff make recommendations on the application of Beckman Model "B" Spectrophotometer savings to **your** operations. No obligation, of course.

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Fig. 2140
GLOBE
125 lb. S.P.
200 lb. W.O.G.

125 lb. S. P. BRONZE GLOBE, ANGLE and CHECK VALVES
Built to LUNKENHEIMER
QUALITY STANDARDS

Want a lower pressure valve to give the same dependable, low-cost service you get in higher pressure LUNKENHEIMER Valves?

Here it is — New Fig. 2140 Globe; Fig. 2141 Angle; Fig. 2142 Lift Check; Fig. 2144 Swing Check. These valves feature Lunkenheimer's traditionally fine design and sturdy construction, plus exclusive silicon bronze alloy stems which eliminate stem thread failure due to wear.

Whatever your requirements for lower pressure service, you'll find these new valves unequalled for dependability and true economy.

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Fig. 2142 LIFT CHECK
125 lb. S.P. 200 lb. W.O.G.

Nowhere in the line is dependability more important than in Check Valves. These Checks function quickly and positively, seat accurately and tightly.

Fig. 2144 SWING CHECK
125 lb. S.P. 200 lb. W.O.G.

withdrawn. After washing the stock with hot water and neutralizing any remaining acid, the treated oil may be further bleached with fuller's earth. The amounts of acidic phosphorus compound and inhibitor used are within the range of 0.5-2.0 percent, based on the oil or fat to be treated. The air blown through the stock is in the temperature range of 50-75 deg. C.

The process is particularly useful in the treatment of tallows and greases that appear black or dark brown in the raw state.

Digest from U. S. Patent 2,468,753, issued May 3, 1949, on an application dated May 15, 1945, to L. F. Henderson, Reading, and L. H. Libby, Boston, Mass., and assigned to Lever Brothers Co., Cambridge, Mass.

BEVERAGES

Low Temperature Bottling Prevents Foaming

According to a patented process, a carbonated beverage can be produced without objectionable foaming by lowering the temperature of the flavoring syrup or cooling the carbonated water, or both, to near or below the freezing point. In making a carbonated coffee beverage, for example, a suitable quantity of coffee syrup is frozen solid in the bottle, after which chilled carbonated water is added.

After the bottle is securely sealed, the syrup gradually dissolves and mixes with the carbonated water. Any carbonic gas liberated during the mixing will collect in the neck of the bottle. And inasmuch as the liberation of gas is relatively slow, no appreciable foaming will result when the beverage is consumed.

Digest from U. S. Patent 2,478,169, issued Aug. 9, 1949, on an application dated Aug. 2, 1946, to J. L. Kellogg, Chicago.

New Clarifying Method Eliminates Chill Haze

Improvement of mildly acid fruit and grain beverages by the removal of soluble organic components capable of causing turbidity on changes in temperature, is the purpose of a new patent. This removal is accomplished by the addition to the beverage of a water-soluble form of lignin, obtained by the alkaline cooking of ligneous woods, and of a proteinaceous material, such as gelatin, casein, egg albumin or suitably purified soya bean protein. The protein is coagulated by the lignin, producing a slowly settling precipitate which mechanically and by adsorption (and possibly absorption), brings

(New Technology Continued)

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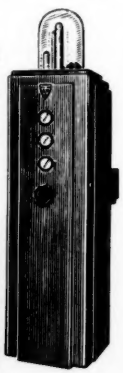

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down various suspended matters in the beverage. The supernatant liquid is decanted, or otherwise separated from the precipitated material.

Digest from U. S. Patent 2,471,474, issued May 31, 1949, on an application dated Feb. 10, 1945, to R. T. Alba and J. S. Wallerstein, assigned by mesne assignments to Wallerstein Co., Inc.

FRUITS AND VEGETABLES

Bitter Orange Juice Due to Limonin

Recent research on the bitter principle of navel oranges confirms the findings of earlier investigations—viz., that it is limonin, a dilactone. The bitterness of navel juice is probably due to a colloidal solution of limonin, stabilized by the juice constituents. Apparently, the formation of limonin is a feature of immaturity of the fruit, because it disappears as the season advances, just as in the case of Valencia oranges.

Working on this assumption, an effort was made to ripen fruit artificially on the tree by treatment with ethylene and acetylene under a neoprene tent. The results were inconclusive. A related bitter substance nomilin, has been obtained from the seeds of oranges and lemons, but this does not occur in significant amounts in the juice of early navels or of very immature Valencias. Some work on the chemical nature of both limonin and nomilin is described.

Digest from "The Bitter Principle in Navel Oranges," by O. H. Emerson, *Food Technology*, Vol. 3, 248-50, July 1949.

Ascorbic Acid Retention Of Frozen Fruits

Study has been made of the retention of ascorbic acid in thawed muskmelon, grapefruit sections, and strawberry puree after freezing and after different intervals of freezer storage. Melon and grapefruit sections were packed both plain and covered with syrup. Strawberry puree was mixed with two concentrations of sugar and packed in two types of containers.

Two varieties of freshly picked melon, packed plain, retained 26 and 37 percent of the reduced ascorbic acid originally present after 24 hr. in the freezing unit. The same varieties packed in syrup retained 77 and 86 percent, respectively. One of the varieties showed no further significant loss during 9 months of storage, but retention in the plain-packed sample of the other dropped from 37 to 18 percent. In melons bought on

(New Technology Continued)

from berries
to taste buds

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What does Handling and Packaging Cost You . . .

An excellent illustration of sound planning, efficient production line layout and accurate weighing on EXACT WEIGHT Scales by Catelli Food Products, Montreal, Canada.

Anyone who attended the technical sessions and exposition sponsored by Wayne University and the Society of Industrial Packaging and Materials Handling Engineers in Detroit will need no reminding of the importance of this faze of business in present day production. The outstanding fact was that some 50% of all productive labor on many products is occupied in handling and packaging. Here is cost control measure Number One. Controlling these costs can come only from sound planning and equipment that fits the job, the product and the personnel. Paramount in many packaging operations are scales, the right kind. For 33 years EXACT WEIGHT Scales have met the challenge of thousands of production lines in every major industry, generally to the satisfaction of engineers responsible for efficient profitable operation. Appraise your handling and packaging, then write for details covering your problem.

EXACT WEIGHT Scale Model #213-S, the most popular consumer packaging scale —Features (1) high speed operation due to extremely short platter fall, (1/8") (2) slant end tower construction which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x 1/4 oz. graduation—Capacity to 3 lbs.

EXACT WEIGHT SCALES

Industrial Precision

THE EXACT WEIGHT SCALE COMPANY

31 W. Fifth Ave., Columbus 8, Ohio

2920 Bloor St., W., Toronto 18, Canada

the market, retentions of reduced ascorbic acid ranged from 36 to 41 percent for plain-packed, and from 90 to 96 for syrup-packed. After freezing and each interval of freezer storage, the syrup-packed fruit showed greater amounts of reduced ascorbic acid. Neither pack showed significant loss of ascorbic acid during 9 months of freezer storage.

Grapefruit sections, packed with or without syrup, showed no significant loss of reduced ascorbic acid in 24 hr. After 1-9 months in the freezer, retentions ranged from 93-102 percent in the plain-packed fruit, and from 96-102 in the syrup-packed.

Strawberry puree with two concentrations of sugar, packed in two types of containers, lost about 20 percent of reduced ascorbic acid content after freezing, 1 month of freezer storage, and thawing. No further losses occurred during 3 and 6 months of freezer storage. Sugar concentration and type of container had no effect on the results.

Digest from "Effect of Freezing and Freezer Storage on the Ascorbic Acid Content of Muskmelon, Grapefruit Sections, and Strawberry Puree," by J. C. Wolfe, R. F. Owen, V. R. Charles, and F. O. Van Duyne. *Food Research*, Vol. 14, 243-52, May-June 1949.

CEREAL PRODUCTS

Light Colored Peanut Protein

A recently patented process removes the soluble coloring matter from peanut skins and yields a lighter colored protein than usual methods. The inventor has found that soluble pigments can be removed by short exposure to dilute acid or alkali solutions.

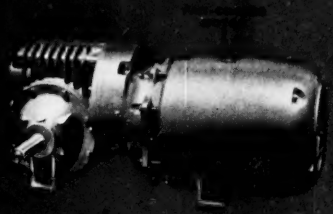
For example, shelled peanut kernels are exposed for 1 min. to the action of a 0.5 percent solution of NaOH, rinsed, and dried to about 10 percent moisture. Kernels are then processed for separation into oil and meal, and the latter is used to prepare peanut protein which is practically free from the color originally present in the skins.

Digest from U. S. Patent 2,463,740, issued Mar. 8, 1949, on an application dated Mar. 29, 1946, to R. S. Burnett, assigned to United States of America.

Enriching Grain Foods

Flours and meals are enriched by blending a vitamin-mineral premix in the proportion of 1/2-1 oz. per 100 lb. flour. For coarse meals, there is the clever expedient of super-enriching a part of the product and coating the particles with an edible, water-resistant film. This portion is then mixed

(New Technology Continued)



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Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master motors, available in millions and millions of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

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Open, enclosed, splash proof, fan-cooled explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

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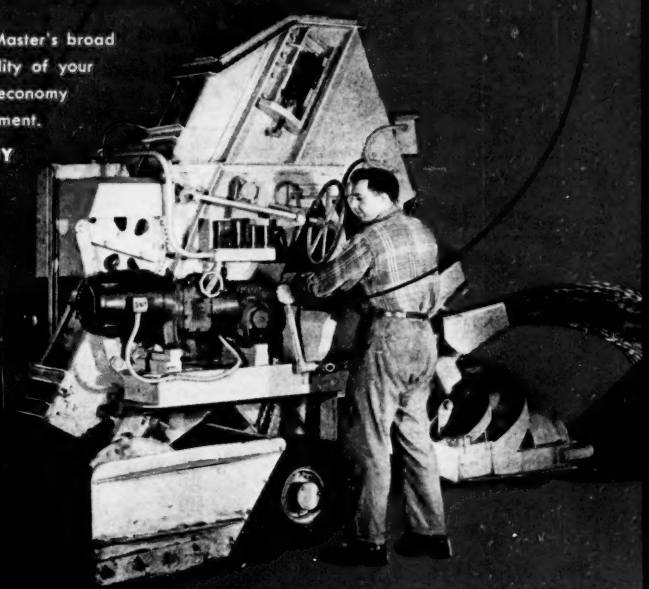

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with the milled product in such proportion by weight as to restore the proper concentration of nutrients. For corn grits, the ratio is 1:800, and for rice 1:200. Enriched bread may be made from enriched flour, but the commercial custom is to use enrichment wafers. These supplement the nutrients of regular bread ingredients, such as yeast and milk solids, and are designed to provide desired nutrient levels without exceeding limits imposed by standards. For certain nutrients, notably riboflavin, calcium, and vitamin D, the normal level may be supplemented with additional quantities from such sources as eggs, wheat germ, soya products, and inactive dry yeast.

Digest from "How Processing Affects Nutritive Values of Grain Foods," by F. W. Nordsiek, *American Journal of Public Health*, Vol. 39, 751-55, June 1949.

MEATS

Frankfurter-Type Meat Product In Convenient "Bite" Size

In a new food product of the frankfurter type, comprising compressed meat particles held together in a unit, the divisions are preferably made of a convenient "one-bite" size to facilitate handling and consumption. The meat composition may be shaped in steam jacketed molds, and the unit as a whole may be partly cooked. In addition, the surface portions of the article may be further heat-treated by infra-red or short-wave cooking.

Whether skin-covered or skinless, the product is so treated as to have sufficient rigidity to preserve its shape. Among the advantages claimed for this patented food are more pleasing appearance and greater palatability, which is further enhanced by final cooking at the time of consumption.

Digest from U. S. Patent 2,475,408, issued July 5, 1949, on an application dated Jan. 11, 1945, to C. T. Smelzer, Forest Hills, N. Y., assigned to Claruel Food Products Corp., New York City.

Automatic Forming Machine Makes Food Patties

Meat patties, fish cakes, sausage, and the like, may be formed in a patented power-driven machine which is entirely automatic. The reservoir for the ground material is easily and quickly detached from the machine for cleaning and sterilizing. The feed mechanism is so designed that material is passed to the mold uniformly with no loss of juices. Size and thickness of the patties can be varied to yield a desired number from a given quantity of material. Uni-

(New Technology Continued)

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Koven

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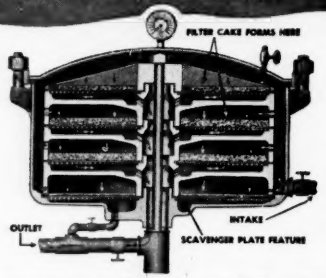

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Candy Syrup
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Syrups
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Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

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formity is thus maintained in weight as well as in size and thickness.

Digest from U. S. Patent 2,475,463, issued July 5, 1949, on an application dated July 17, 1946, to S. Santo, Deep River, Conn.

MISCELLANEOUS

DDT Does Not Penetrate Fruit Rinds And Peels

Traces of DDT and parathion have been found in the peel but not in the pulp of harvested oranges, lemons and grapefruit. The insecticides have also not been found in the pulp of apples, pears, peaches or plums following treatment with standard dosages. These were the findings of chemists at the University of California Citrus Experiment Station, Riverside, Calif.

In experiments conducted to determine the feasibility of removing DDT and parathion surface residues without injury to apples and pears, sodium silicate eliminated as much as 90 percent of the DDT. An alkaline soap worked well with oranges. None of the treatments afforded good clean-up of parathion-treated fruits.

Digest from "DDT Found in Peel But Not in Pulp of Harvested Citrus Fruits," from papers by F. A. Gunther, G. E. Carman, W. H. Ewart, M. M. Barnes, M. I. Elliott and R. C. Blinn, presented at ACS meeting, San Francisco, March 30, 1949.

Sugar Fermentation Process

Improvement in the method of removing lime and undesirable organic matter from fermentable materials, such as molasses, is the basis of a patented process. In a typical procedure, molasses diluted with hot water is treated with H_2SO_4 at 3-5 pH. After reacting for about 1 hr., the liquid is centrifuged for removal of lime sludge. The discharged liquid, which has lost about 90 percent of the calcium, but still carries suspended organic matter, is heated to 300 F. at 50 lb. pressure. Suspended organic matter is dissolved, and a clear liquid is obtained which, upon dilution and cooling, will not precipitate and will not contaminate the yeast. Steam released from the pressure tank is returned to the mixing tank at the head of the process. Lime sludge is washed, and the clear liquid returned to the mixing tank. Advantages of the process lie in the prevention of scale in evaporators and stills, and in better quality and yield of useful products.

Digest from U. S. Patent 2,464,611, issued Mar. 15, 1949, on an application dated Mar. 27, 1945, to Gustave T. Reich, Philadelphia.

—*End*

..Use Century Type RS Single Phase Brush Lifting Motors

Century Type RS, repulsion start, induction, single phase brush lifting motors are ideal for installation on reciprocating pumps, compressors and other hard-to-start equipment.

They provide the power to start under load — even in very cold weather — without overmotoring the driven machine.

Repulsion start motors provide greater starting torque per ampere of current than any other type of single phase motor — consequently the least disturbance to line voltage — an advantage on long or small capacity transmission lines.

They are widely used in the rural areas which usually have only single phase energy.

Many power companies are recommending the use of single phase motors up to 7½ HP, in residential districts of the larger cities, because polyphase energy is not always available.

Century Type RS brush lifting motors are built in sizes from ½ to 20 HP.

Century builds a wide range of types of motors from 1/6 to 400 horsepower for all the popular electric power applications.

Specify Century motors for all your electric power requirements.

Popular types and standard ratings are available from factory and branch office stocks

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BAKING INDUSTRY leaders are welcomed at official opening of 1949 Baking Industry Exposition by A. Skean, head of Atlantic City Convention Bureau. Shown left to right: Tom Smith, ABA and exposition secretary; A. Vos, Jr., ABA president; Skean; Gerard R. Williams, exposition chairman; Harry W. Zinsmaster, chairman of ABA; C. W. Steinhauer, president of Bakery Equipment Manufacturers Assn.; and L. E. Caster, chairman and president of American Institute of Baking.

Bakers Applaud Exposition

Promise of the industry's continued expansion through improved methods of production and merchandising held the attention of the American Bakers Association, at its annual meeting in Atlantic City, in October. And the industry saw one of the most extensive displays of new equipment ever presented to the food industry, gathered for the first national bakers' exposition in 13 years.

In opening the convention, Harry W. Zinsmaster, ABA chairman, predicted the industry's growth to a $7,500,000,000 business within the next ten years. He pointed to the 1946 sales of $2,500,000,000 as against the 1949 total of $4,000,000,000 as evidence of this trend.

A. Vos, Jr., association president, attributed this growth to an increasing appreciation of bakery goods on the part of the American housewife. He disclosed that 90 percent of the bread and 45 percent of the cakes and sweet rolls consumed in this country come from bakeries today. This growing preference, plus the increase in population, accounts for the growth in dollar income.

The trend toward one-story operations with high headroom has taken over, according to Charles E. Misch, bakery consultant, N. Y. C. He advised flexible facilities for increased production and plant expansion, mechanization wherever human effort can be replaced, modernization of equipment to maintain quality and uniformity of product, vigilant sanitation, and employee welfare. These factors, along with goodwill promotion within the community, are all a part of the overall bakery design.

Methods of handling route credits intelligently and profitably were outlined by R. L. Walker, Freihofer Baking Co., Philadelphia. Walker divided the credit system on retail routes into two divisions—the system and the salesman—and he emphasized that neither can function properly without the other. He said that a system of controls, suitable route book, accounting system, and rigid credit period are necessary to conduct a credit business satisfactorily. Turning to salesmen's failures to be good credit managers, two of the most important causes were seen as over-selling and poor judgment in extending credit.

Slow production and delayed deliveries are major reasons for bakery department failure in many of the nation's supermarkets, according to T. L. Awrey, head of a multiple-unit chain of Detroit bakeries. He pointed out that the average supermarket customer is a "once a week" customer. Consequently, this customer will not come back a second time for bakery goods if production is late at the bakery or the delivery system is inadequate. He warned that bakery departments in supermarkets must build their own clientele to avoid this problem.

Impact, continuity and repetition are the three components necessary for successful advertising campaigns, K. B. Arrington, advertising executive of Omaha told the bakers.

Declaring that the economic security which is being attempted by various government controls is overstepping the needs of the situation, the U. S. baking industry voiced its opposition to the Brannan Plan and other similar farm-subsidy schemes. In resolutions passed by the board of governors of the association, the industry also attacked a proposal to subsidize bakers who would increase the use of milk in bread, pointing out that government subsidies to an industry could eventually result in government control of such industry.

In another resolution, the industry charged that the U. S. Department of Agriculture's policy of supporting egg prices will curtail the baking industry's purchases of eggs. It was explained that the government's support policy destroys historic seasonal variations in price and has added materially to the cost of eggs to the baker. The resolution pointed out that the baking industry uses about 300,000,000 dozen eggs a year and that it is necessary to the prosperity of the farmer that the baking industry continue to purchase its eggs in substantial quantity.

Bakers Against Subsidies

In attacking farm-price subsidy plans, the bakers said the present policy of financial paternalism weakens responsibility, diminishes self-reliance, stifles individual enterprise without providing any basic security, and ultimately destroys the inherent dignity of the individual.

They went on further to say that this attempt to insure high prices to the farmer and low costs to the consumer, with the taxpawer paying the difference, is misleading and not in the interest of the consumer, who in the final analysis pays the bill.

More than $2,000,000 worth of baking equipment was displayed, as the $4,000,000,000 industry opened its first exposition in 13 years and the largest in its history. Making the rounds of the displays of the 258 exhibitors, over 10,000 bakers saw new equipment and methods of improving production and quality of bakery products.

One of the many striking displays was a transparent delivery truck made of Plexiglas and aluminum. A display of packaged bakery products, neatly arranged inside, was visible from the

outside, like merchandise in a show window. Many bakers stopped to ask the cost of this Chevrolet truck and how soon deliveries could be made.

At one exhibit, special equipment turned out 1,200 dozen doughnuts an hour. At another exhibit, Kaiser rolls were turned out at the rate of 120 a min. by a machine, which at the same time topped, them with seeds.

Bakers also discovered American Machine & Foundry's continuous automatic layer, sponge and pound cake mixer. They also saw new flour handling, bread conditioning, automatic roll proofing, bread depanning, rack washing, bun-bread depanning, comminuting, cookie making and decorating, materials handling, pan greasing, roll slicing, dry ingredient dispensing, water cooling, conveying, icing and decorating, bread wrapping, pie packaging, bread cooling and mixing equipment.

They saw, too, a high-speed tart and pie molding and filling unit, sanitary pumps, an automatic method of adding yeast to the dough mix, a new chain-type cookie oven, as well as new ingredients like Land O' Lakes improved superheated spray dry milk that is reported to increase absorption and yield, improve uniformity, and extend fermentation tolerance.

Institute Boosts Prepackagers

New packaging emphasis brought on by the buyers' market, and the formation of a prepackagers association highlighted the 11th annual meeting of the Packaging Institute, in New York City, last month.

Meeting under the auspices of the Institute, the prepackagers organized as the Produce Prepackagers Association, with Paul B. Dickman, Dickman Farms, Ruskin, Fla., chosen as first president. Whether the new organization will continue as an independent group or join with an already established association, such as the Packaging Institute, was left for later determination.

L. V. Burton, executive director of the Institute, stressed quality, cost and marketing, as the points for development in catering to the buyer. Management, he said, has several alternatives in preparing for a buyers' market: 1. The packer may package non-seasonal goods for normal shelflife and keep the unit of sale under control so that slow or old stocks are kept out of trade channels; 2. he may build a longer shelflife into the product and its package so that salesmen need not spend so much selling time checking over retail stocks, and 3. he may employ normal shelflife and normal sales calls, and rely on increased sales promotion to move goods.

Packaging efficiency can mark the difference between success and failure in a buyers' market, in the opinion of Arthur D. Hyde, vice-president, General Mills, Inc. While recognizing that packaging is a top management concern, he emphasized the responsibilities of the packaging specialist. It is the specialist who must make the package a better sales tool, select materials and processes, standardize packages and materials, reduce package weight, and improve handling ease. Management expects the package to meet three broad objectives, Mr. Hyde continued: 1. Help sell the product; 2. help serve as a carrier for the product, protecting it during its market life, and 3. cut the cost of distribution.

Five cost-reduction considerations for users of glass containers were outlined by J. H. Toulouse, Owens-Illinois Glass Co.: 1. Use the plain, round, cylindrical, short, lightweight bottle, which is adaptable to the higher speed filling lines; 2. use the short, round bottle to economize on shipping weight; 3. within certain limits, special finishes can be had without use of an expensive bottle-body mold; 4. a stock-mold design has advantages over a private mold in that it costs far less, insures quicker delivery, and is often obtained from many sources; 5. weigh greater display value of non-round bottle against filling line efficiency of the round type.

Vacuum cooling as a method for rapidly lowering temperatures in produce emerged as the highlight of the prepackagers meetings. B. A. Friedman, Bureau of Plant Industry, USDA, described the method, which employs steam aspirators using steam ejectors as nozzles to produce a vacuum. This, of course, causes evaporation, thus cooling. In small volume trial runs, only 3-5 min. were required to bring packed spinach and corn from 75 to 34 deg. F.

Similar results were had with unwrapped asparagus, but tomatoes and oranges did not respond well to this procedure. Tests made by Vacuum Cooling Corp., Salinas, Calif., indicate that green leafy vegetables cooled the quickest. It was found best to prepackage with perforated film in all cases. Economies with this procedure also showed up in shipping, since top icing of the reefer was eliminated and more crates per car could be packed.

Seminars brought out agreement that there was great need for smaller packs of prepackaged produce as well as machinery to do the packaging. It was also agreed that the role of the warehouseman and distributor is declining in importance, since the trend is for prepackagers to make daily deliveries direct to retail stores, just as bread and milk are distributed at present.

All Institute officers were re-elected. They include: President, C. L. Barr, vice-president of F. B. Redington Co., Chicago; Vice-President, Charles O. Kendall, E. R. Squibb & Sons, New York City; Vice-President, H. W. Stevens, Benjamin C. Betner Co., Devon, Pa. L. V. Burton continues as executive director.

Along with President Dickman, the prepackagers elected: Vice-President, George McCargar, Aunt Mid Co., Chicago; Secretary, Ralph David, *Pre-Pack-Age;* and Treasurer, W. Lee Duvall, E. L. Duvall & Son, Baltimore.

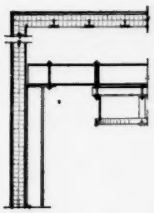
Beer-Gushing Discussion Tops Brewers' Meeting

Further advances in the continuing study of the problem of beer-gushing, along with a full-blown report on pasteurization and lengthy member discussions on other technical problems, were high points in the 42nd annual convention of the Master Brewers' Assn. of America, at Los Angeles, in October.

Malt as a probable factor in beer-gushing was added to the list of already recognized factors by Philip P. Gray, Wallerstein Laboratories, New York City. It appears, he said, that some constituent of certain malts studied at individual plants, is responsible for the gas-evolving nuclei, although at present there is no definite evidence pointing to any particular fraction. The same malt, he added, in other plants may be satisfactory, so that a combination of factors, rather than the malt alone, evidently is responsible.

Basing his conclusion on experiments to date, Mr. Gray listed four conditions, among others, that have been established as capable of producing wildness in any beer, especially in combination with each other. The conditions: Prolonged cold storage of the package; presence of certain metals, such as iron; aeration and oxidation of the beer; and vibration.

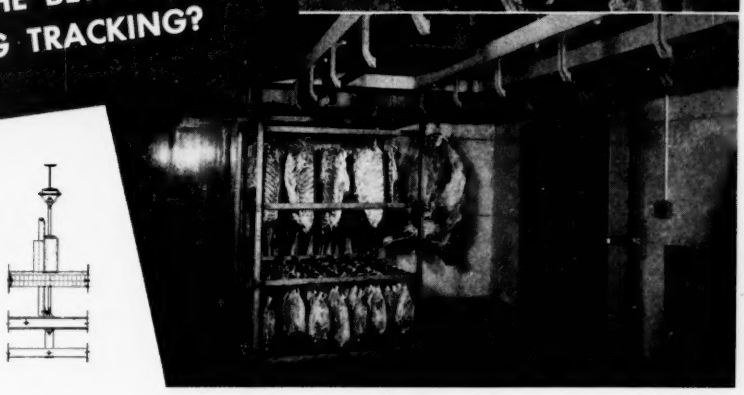
After reviewing the history of beer pasteurization, F. C. Baselt, American Can Co., New York City, brought his talk down to the "bready" characteristic that is most often associated with "pasteurized flavor." This quality, he said, has been found with certainty to



• INTERIOR FRAMEWORK?

This method provides for tracking support by a structural framework erected within the insulated room.

WHICH IS THE BETTER WAY TO HANG TRACKING?



• EXTERIOR FRAMEWORK?

An alternate method is to provide support by puncturing the insulation seal and supporting track hangers from the building structure.

There are two methods by which overhead tracking can be installed in insulated rooms. One is to suspend the tracking from a structure built entirely within the room. The other is to hang it from overhead supports. Whenever possible, the first method should be followed. A structural framework entirely within the insulation envelope avoids puncturing the vapor seal. These punctures allow heat infiltration, and they become enlarged by vibration. Then, moisture and ice can collect around the hanger rods, resulting in loss of insulating efficiency at these points.

With certain types of construction, interior support is impossible, and the insulation must be punctured. Then, precautions should be taken to reduce heat infiltration at the punctured points. When suspended ceilings are used, for example, cork sleeves applied to the hanger rods above the ceiling prevent frosting of rods and damage to insulation.

If you have a problem concerning low-temperature insulation, phone an Armstrong engineer at any of Armstrong's District Offices. His advice will be based on wide experience as well as sound engineering principles. And using Armstrong's Contract Service for your insulation work will assure you of the best materials and finest workmanship. For complete details on this service write to Armstrong Cork Company, 4212 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS Ⓐ INSTALLATION

FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.

NEWLY ELECTED officers of Master Brewers Association of America. Left to right: Joseph S. Pickett, treasurer; Francis N. Ward, 2nd vice-president; Edward W. Huber, president; Edward E. Neschke, 1st vice-president; Henry R. Henius, 3rd vice-president; and Allan E. Beach, executive secretary.

be the effect of oxygen, both before and after bottling. A product that has been protected against oxygen throughout its life in the cellar and packaged without the inclusion of oxygen, will exhibit a remarkable resistance to warm temperature during pasteurization and storage.

On the other hand, Mr. Baselt continued, bready flavors can be developed at room temperatures merely by including air in the package. These flavors, therefore, are not directly the result of pasteurization. Rather, pasteurization simply accelerates the oxidation by virtue of the higher temperatures.

Listing good practices to follow in pasteurizing beer, the speaker particularly emphasized these three: Package with low air content; hold pasteurization temperatures to the 140-150 deg. F. range; don't employ trick agitation or high speed warming or cooling.

Considerable time was devoted to the association's materials improvement activities, with Thomas R. Gettelman, Milwaukee, discussing the broad outlines and explaining the small 1949 barley crop of 233,000,000 bu., 27 percent under the 1948 output. Last spring, he said, the government announced support prices at 90 percent of parity for wheat and flax and only 72 percent for barley. This caused a shift in planting from barley to wheat and flax. Hot, dry weather also caused some premature ripening and reduced the acreage yield. One of the largest crops in history was predicted for 1950, however, because of higher prices and the great popularity of the new U. of Wisconsin Moore barley.

Pickle Packers Push Promotion

A cucumber supply of nearly 12,000,000 bu. was reported for 1949 at the 57th annual meeting of the National Pickle Packers Association, in Chicago.

Added to the modest carryover from the 1948 crop, this intake assures for the first time in several years, sufficient pickles to satisfy the steadily increasing consumer demand. That demand has grown from approximately 6,000,000 bu. in 1939 to some 9,500,000 bu. in 1948. Consumption during 1949 has been at the rate of nearly 1,000,000 bu. per month. In contrast, the cucumber intake or production has ranged from approximately 4,000,000 bu. from 62,370 planted acres in 1939 to a previous high of 10,500,00 bu. from 149,450 acres in 1946. The 1949 planted acreage was reported to be 143,500.

Particular emphasis was put upon pickle promotion, based on the ample supplies, in spite of the 20 percent decrease in carryover of stocks, as compared with Sept. 1, 1948, and approximately 25 percent decrease below what has usually been considered a normal or safe inventory. The 1949 cucumber quality was reported to be the "best without exception," which means that highest quality pickle products will be made everywhere available to back up the promotion. Not more than a "normal" carryover is anticipated for next October.

Executive Secretary E. T. Miller announced a 1950 National Pickle Week program expanded to include a merchandising school for pickle packers and greater emphasis on publicity and merchandising at the grocer level.

Technical research work is to be continued at Michigan State College under the guidance of Dr. F. W. Fabian, with the suggestion that package studies be included.

A large attendance of more than 165

DAMP-TEX
ENAMEL
FOR WET
EQUIPMENT
and WALLS
FRIEND
OF THE PLANT
OWNER... WHO HAS
A WET SURFACE
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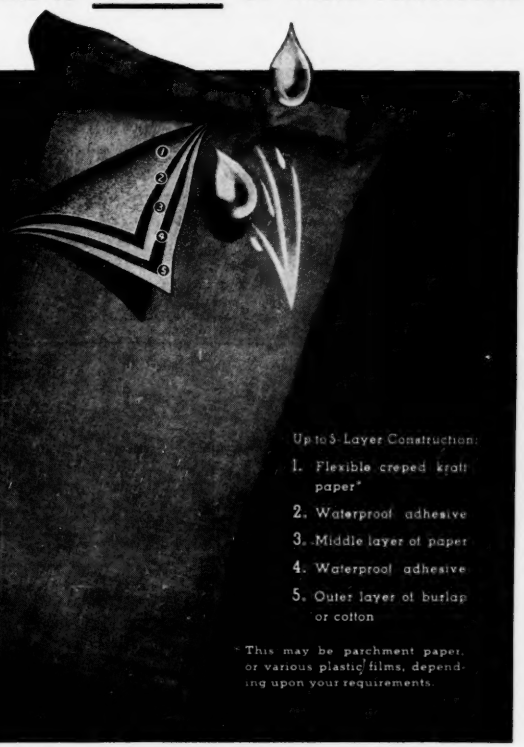

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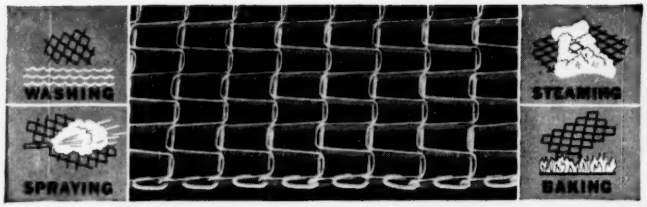

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registered and participated in the discussion from the floor.

Officers elected: President, Leon Glaser, Glaser, Crandell Co., Chicago; Vice-President, James Irwin, H. W. Madison Co., Cleveland; Treasurer, Earl Van Holten, J. G. Van Holten & Sons, Milwaukee.

Directors for three years are: John Miller, Brown-Miller Co., New Orleans;

NEW PICKLE PRESIDENT (left), Leon Glaser, Glaser, Crandell Co., Chicago, takes "office" from retiring president Harry Conley, Green Bay Food Co., Green Bay, Wis., at 57th annual meeting of National Pickle Packers Assn., at Chicago.

Edward Guggenheimer, Block & Guggenheimer, New York; Albert Forman, L. C. Forman & Sons, Pittsford, N. Y.; and James Dailey, Jr., Dailey Pickle & Canning Co., Saginaw, Mich.

Ice Cream Makers Look to Costs

Improved cost controls and technical advances in ice cream production highlighted the sessions at the 45th annual convention of the International Association of Ice Cream Manufacturers, in Los Angeles, late in October.

Taking up more or less where he left off at the previous year's convention, O'Neal M. Johnson, manager of the association's department of statistics and accounting, outlined six reasons for maintaining accurate cost accounting systems: (1) All selling prices should be based on production costs. (2) Production costs point up the most and least profitable items. (3) Correct valuation of inventories requires knowing product cost. (4) Product costs show where savings can be made. (5) Use of product costs facilitates the lo-

eating and stoppage of plant losses. (6) Product costs indicate the methods necessary to conduct business properly.

Some of the steps necessary in setting up a cost system were discussed in a paper by J. E. Shipley, Abbotts Dairies, Philadelphia (but presented by C. E. Whitely, Arden Farms, Los Angeles). First, he said, the plant operator must look to the elimination of leaks and avoid manufacturing errors. As an aid to this end, he will find a daily reconciliation helpful. These checks should be kept on each product, on important flavoring materials, and on sugar.

"Be sure," he warned, "that daily inventories are actual counts, not just book figures. If you have any shortages," he continued, "do something about them. Find where it happened—what happened—who spilled what—who left the valve open—who made the mistake. Control is lost if action is delayed."

The flavor cost, he said, should be checked on each flavor ice cream you make. You will find, he added, that some flavoring materials cost more than the dairy products. Costs of material for each kind and size of package should also be checked.

Getting over to the technical side of the meeting, C. D. Dahle and W. F. Collins, Penn State College, gave their findings on acid standardization for ice cream mixes. They reported that certain alkalis, used to reduce excessive acidity in ice cream mixes, lowered the mix viscosity when gelatin or cellulose gum was used as the stabilizer. Certain salts, added to reduce viscosity, were effective when gelatin and C.M.C. were the stabilizers. In mixes containing Dariloid XL and cellulose gum, the viscosity was not reduced, but in some cases, increased by the salts.

(Convention Reports Cont'd)

G. STANLEY McKENZIE, who presided at 45th annual convention of IAICM.

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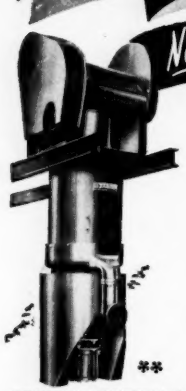
J&C*

New ZM Press

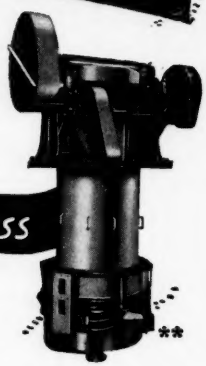
The ZM Continuous Pulp Press is the answer to the demand for a press of smaller capacity, but retaining the high efficiency and all of the outstanding features of the parent press.



ZL Press

Zenith* Model ZL Pulp Presses are being used for dewatering, beet pulp, pineapple, tomato pomace, corn germ and fibre, vegetables, brewers grain, cherries, citrus fruits, fish, paper pulp, and many other materials, assuring a direct cake of uniform consistency.

100% continuous . . . from storage bin to pressed cake, the ZL Press dewaters *up to 26 tons of wet pulp per hour.*



Model ZP . . . our smallest press with less capacity than the ZM or ZL but having a very high efficiency.

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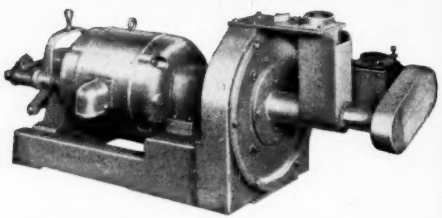
WIDELY USED FOR GRINDING CRACKERS AND OTHER BAKED GOODS



Bauer SINGLE REVOLVING DISC MILLS

The illustration shows a Bauer No. 248 Attrition Mill which is ideally suited for grinding crackers, sweet rolls, and other baked goods. The machine is equipped with built-in motor, variable speed control, and screw feeder.

Bauer Single Revolving Disc Attrition Mills, in 18" to 36" sizes with various types of feeders, are adaptable to grinding, granulating, cracking, and shredding many kinds of products. Plates are available for routine and specialized operations. Motor or belt drives.

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LABORATORY MILLS

Mixes in which the acidity was increased approximately 0.1 percent produced workable products in all cases when cellulose gum and Dariloid XL were used as stabilizers. This high acidity produced extremely viscous mixes in some instances when gelatin was used as the stabilizer. Alkalis and salts, however, restored the viscosity of the mixes to a workable state. Nothing was gained, they agreed, by adding alkalis or salts to the high acid mixes containing cellulose gum or Dariloid XL, since the viscosities encountered were not excessive. Mixes made with superheated condensed milk were higher in viscosity than when plain condensed skim was used, hence a reduction in stabilizer should be made.

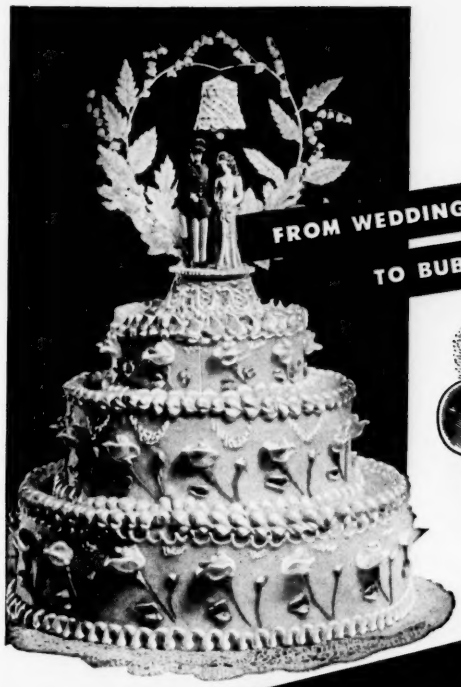
Ice cream shrinkage as affected by the state of milk proteins was reported by N. P. Tarassuk and J. T. Hutton, University of California. They summed up their report with these conclusions:

1. Marked lowering of the surface tension of mix promotes shrinkage of ice cream. 2. Previous freezing of mix ingredients, mix acidity and salt balance were observed to exert a variable influence on shrinkage. 3. Milks from individual cows, processed into ice cream mixes, exhibited wide variations in shrinkage susceptibility. This variation may be partly due to difference in state of protein in original milks with respect to incipient proteolysis as indicated by tyrosine value. 4. Aging of ice cream mix for periods up to one week, after first 24 hr., increased shrinkage. 5. Incipient hydrolysis of milk proteins, as indicated by tyrosine value, apparently is responsible for added aging-shrinkage.

6. Additions of small amounts (0.1 percent) of protein hydrolysates accelerated shrinkage. 7. Raw ice cream mix, processed from raw milk products, was very resistant to shrinkage. 8. Denaturization by heat of whey proteins increased shrinkage. 9. Addition to standard mix of less than 0.05 percent of undenatured globulin (protein fraction which was precipitated on prolonged dialysis of whey proteins concentrate) markedly decreased the shrinkage of ice cream. This and other data indicate that state of globulin fraction of whey proteins is an important factor in shrinkage.

All officers of the association were re-elected—G. S. McKenzie, Creameries of America, Los Angeles, president; Ridgeway Kennedy, Abbotts Dairies, Philadelphia, vice-president; I. N. Hagen, I. N. Hagen Ice Cream Co., Uniontown, Pa., treasurer; O'Neal M. Johnson, Washington, D. C., assistant treasurer; and R. C. Hibben, Washington, D. C., executive secretary.

End.



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Technical GLYCERINE NEWS

COMPRESSED FOODS THAT ARE FRIABLE. Major problem of compressed food manufacturers is friability. One answer is the use of a small quantity of glycerine prior to compression. The glycerine is said to produce a firm product which can be easily broken when ready for use. (F-1)

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A NON-TOXIC REFRIGERANT. A refrigerant mixture, particularly suited for use with foodstuffs because it has no objectionable taste and is edible, may be prepared from glycerine and water. (F-2)

★ ★ ★

NEW SUBSTITUTE FOR CORKS. Closures for foodstuffs may soon be made with a new cork substitute in which glycerine is an essential ingredient. The new product is claimed to have bulk density and resilience comparable to natural cork. (F-3)

★ ★ ★

GLYCEROL VISCOSITIES TABLE AVAILABLE. Miner Laboratories, headquarters for the Glycerine Producers' Association program of glycerine research, has prepared a table of viscosities of glycerol in aqueous solution from 0 to 100 per cent, at from 0 to 100 degrees C. You can obtain your copy by checking item F-4 on the coupon below. (F-4)

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SECRET OF NEW QUICK-METHOD CAKES. The potent ingredient in the new quick-method cakes is a shortening containing a glycerine compound. This shortening makes possible the use of more sugar and milk to improve the cake. (F-5)

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PLANT SAFETY HINT. If your workers use safety goggles, glycerine is a must. It's one of the best anti-fogging agents—and it's a good lens cleaner, too. (F-6)

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Food Industry News

See No Change in Food Supplies Resulting From New Supports

Congress has been casting about ever since the end of the war for a "permanent" farm price support program.

In 1948, it voted for wartime 90 percent supports for 1949 crops, with "permanent" 60-to-90 percent Aiken Law supports to go into effect in 1950. In 1949, it decided to continue 90 percent supports during 1950—and let the "permanent" 75-to-90 percent Anderson bill go into gradual effect, beginning with 1951.

That's the postwar pattern of farm legislation, and what it proves is this: When it comes to voting its choice between two farm price support bills, Congress won't put into effect the bill that provides for lower price supports.

Congress has repeatedly postponed the day when the so-called sliding scale support programs go into effect. Both the Aiken and the Anderson bills were designed to lower support levels when surpluses began to mount.

This kind of voting record leaves only two farm programs in the running for Congress to work on when, next year, it takes up farm programs again: The 90 percent program that it has continued ever since the war, and the Administration's Brannan plan—a 100 percent-of-parity scheme designed to be applied to any and all farm crops. It would emphasize meat, dairy and poultry products, fruits and vegetables.

New Bill

The Gore-Anderson bill, which Congress approved at the close of the session, has these general provisions: Mandatory support at 90 percent of parity for the so-called basic crops—corn, cotton, wheat, rice, peanuts and tobacco; mandatory supports at 75 to 90 percent of parity for wholesale milk, butter and dairy products; mandatory support at 60-to-90 percent of parity for potatoes, wool, mohair, tung nuts, and honey; support at the discretion of the Secretary of Agriculture at any level up to 90 percent of parity for other farm crops—including hogs, eggs, chickens, turkeys, flaxseed, soybeans, sweet potatoes, dry field peas, and dry edible beans, all of which were mandatory support commodities this year.

For the basic crops that must be supported at 90 percent of parity, Congress came up with a new gimmick: The Secretary of Agriculture is directed to figure the parity prices under the long-used 1909-14 base formula, and under the new "modernized" parity using the most recent ten years as the base. Then, the crop is supported at 90 percent of whichever parity formula gives the farmer the highest price.

The experts—in government and in industry—who have been trying to get farm production switched from wartime-needed grains and cotton to peacetime-needed meat, milk, chickens, eggs, and vegetables, have lost out in the new law.

So No Switch

Grain and cotton farmers are getting price guarantees for 1950 that are as high as for 1949—thus providing them with an incentive to continue to produce their present crops.

On the other hand, the supports for dairy products, pork, and poultry products—which benefited from 90 percent support legislation this year—have been lowered, thus reducing the incentive for farmers to switch over to these products.

The law provides lower support levels for the years 1951-54. But this is to be another one-year law. The reasons are several: 1. Surpluses are already large and expensive, and will grow even larger and more expensive next year, despite acreage controls and marketing quotas; 2. the 1950 law makes no real attempt to cope with the farm problem—it merely continues the "incentive for production" farm policy that grew like Topsy during the war; and 3. there's an election coming up in the fall of 1950.

By next fall, all these factors will have come to a new head. And the Democrats will be out plugging for the Brannan Plan as a way of giving the farmer higher supports on the foods that contribute most to farm income, giving the consumer the benefit of lower market prices, and providing an answer to the problem of what to do about farm surpluses.

End of Steel Strike Nips Can Shortage

Settlement of the steel strike eased the concern food canners were beginning to entertain for winter can supplies.

With the bulk of fruit and vegetable canning out of the way, December and January are traditionally slow months for the suppliers of food cans. But the growing citrus industry, particularly orange concentrates, is bringing about a slight change in what used to be a fairly stable demand.

Concensus of top can suppliers was that citrus canners would be supplied, though distribution might be occasionally spotty. Much, of course, was expected to depend upon how fast steel sheet could be fed through the empty pipelines to the can makers.

While the strike was in progress, the affected manufacturers estimated that serious curtailment in can output of all types would occur by November 15. Had the strike continued beyond that date, production would have dwindled rapidly.

(Industry News Continued)

FARM PRICE SUPPORTS—1949 and 1950

	Percent of Parity Support		Support Price Levels		Production Controls		Commitments and Losses 1948 plus 1949 to date
	1949	1950	1949	1950 (est.)	1949	1950 (est.)	(add 000)
Mandatory 1949 & 1950							
Corn (bu.)	90	90	1.41	1.41	no	yes	$477,000
Wheat (bu.)	90	90	1.94	1.94	no	yes	512,000
Rice (bu.)	90	90	1.78	2.04	no	yes	370
Peanuts (lb.)	90	90	0.105	0.104	yes	yes	50,000
Potatoes (bu.)	60	60–90	1.07	1.01–1.51	yes	yes	214,000
Wholesale milk (cwt.)	90	75–90	3.51	3.31–3.97	no	no	15,000
Butter (lb.)	90	75–90	0.578	0.528–0.634	no	no	60,000
Mandatory, 1950							
Tung nuts (ton)	none	60–90	none	60.60–90.90	no	no	.....
Honey (lb.) (comb)	none	60–90	none	0.176–0.264	no	no	.....
Permissive 1950, Mandatory 1949							
Hogs (cwt.)	90	up to 90	15.90	nmt* 17.10	no	no	.....
Eggs (doz.)	90	up to 90	0.35	probably 0.33	no	no	104,000
Chickens (lb.)	90	up to 90	0.25	nmt* 0.262	no	no	.....
Turkeys (lb.)	60–90	up to 90	0.211	nmt 0.328	no	no	180
Soybeans (bu.)	60–90	up to 90	1.40	nmt 2.30	no	no	22,800
Dry field peas (cwt.)	60–90	up to 90	3.06	nmt 5.05	no	no	28
Dry edible beans (cwt.)	60–90	up to 90	4.93	nmt 7.64	no	no	1,820

*nmt—not more than.

Wallace F. Traendly

M. A. Williamson

Traendly Named New FI Publisher To Succeed "Maje" Williamson

M. A. Williamson, vice-president, McGraw-Hill Publishing Co., Inc., and publisher of FOOD INDUSTRIES since its founding, relinquished the latter post November 15 to undertake a company-wide survey for the parent organization. Williamson will be succeeded by Wallace F. Traendly, former vice-president and director of Reinhold Publishing Corp.

"Maje" Williamson joined McGraw-Hill in 1920 as the sales representative for what is now *Chemical Engineering,* in the Philadelphia area. He was among the first to realize that food processors had many problems in common. He also saw that these processors made up a single large and diversified industry. Up to this time, the field was looked upon as being composed of small groups of unrelated industries. He proposed a magazine devoted to food processing, and in 1928 FOOD INDUSTRIES was born. Williamson became publisher of both the new publication and of *Chemical Engineering.*

"Father" of FI

In the intervening 21 years, "Maje" has been the guiding force in maintaining *Chemical Engineering* as the leading publication in its field. And as the "father of FOOD INDUSTRIES," he has been largely responsible for that magazine's growth to its present eminence as the only publication serving the whole food processing industry.

"Wally" Traendly, the new publisher, brings to FOOD INDUSTRIES an exceptional background and training. He joined the Reinhold company ten years ago as a sales representative of its *Chemical Engineering Catalog* and of the American Chemical Society publications. Since April, 1947, he had been advertising manager of those publications. Traendly attended Colgate University and was graduated from Pratt Institute in chemical engineering. He has also been engaged in chemical sales work with International Nickel Co., Victor Chemical Works, and Westvaco Chlorine Products Corp.

Touch Food Companies In Wage-Hour Laws

The new wage-hour amendments, which go into effect on Jan. 25, raise the minimum wage to 75c. an hour. They add first processing of buttermilk to the existing exemptions for the processing and handling of agricultural and dairy products. And eliminate the exemption for fish canners.

The "area of production" rule remains the same. An amendment to let the Secretary of Agriculture instead of the Wage-Hour Administrator define "area of production" was dropped in the compromise bill which came out of the Senate-House conference.

There are several types of exemptions from the wage-hour law in food processing. Some apply only to operations within the "area of production" of the commodity. Some apply to certain operations no matter where they are performed. Some give exemption from both the minimum wage and the 40-hr. week. Others give only an overtime, or partial-overtime, exemption.

These are the exemptions as they will apply on Jan. 25:

1. Both minimum wage and overtime exemption for all employees engaged within the "area of production" in the following: Handling, packing, storing, ginning, compressing, pasteurizing, drying, preparing in their raw or natural state, or canning of agricultural or horticultural commodities for markets, or in making cheese or butter or other dairy products.

2. Overtime exemption, year-round, for all employees in a plant in which the employer engages in the following: (a) first processing of milk, buttermilk, whey, skimmed milk, or cream into dairy products; (b) processing of cottonseed; or (c) the processing of sugar beets, sugar-beet molasses, sugarcane, or maple sap into sugar (but not refined sugar) or into syrup.

3. For 14 work weeks each year, exemption from overtime of all employees in a plant in which the employer engages in the first processing, canning, or packing of perishables or seasonal fresh fruits or vegetables.

4. For 14 work weeks each year, exemption from overtime for all employees in a plant, within the area of production, in which the employer engages in (a) first processing of any agricultural or horticultural commodity during seasonal operations, or (b) handling, slaughtering, or dressing poultry or livestock.

A change has also been made regarding the exemptions for fishery employees. The present law exempts employees engaged in catching fish and in processing, propagating, marketing, freezing, canning, curing, storing or distributing any fishery products or byproducts. The amendments will lift the exemption from the minimum wage only, but leaving the overtime exemption, for employees engaged in canning fish and seafood products.

USDA Sees Food Output Holding Up in 1950

"Food consumption per capita in 1950 probably will be at least as high as in 1949 and might even increase slightly. Consumer purchases of food will be encouraged next year by plentiful supplies and by the slightly lower retail prices which appear likely."

That is the prediction that leads off the Department of Agriculture's annual survey of the outlook for the food business for the coming year, based on trends established during the past year.

This report, *The National Food Situation,* prepared by the USDA Bureau of Agricultural Economics, also discloses an expectation that raw materials costs of the food processor and other users of farm food commodities will be down. The report puts it this way: "1950 prices received by farmers might average as much as 10 percent below this year's level." This prediction was made, however before Congress passed the new farm legislation giving farm crops support

prices in 1950 as high or higher than this year.

BAE is banking on higher consumption of these foods: Lard, pork, eggs, butter, cheese, canned fish, dry beans, frozen foods, and fresh vegetables. These increases, the USDA experts anticipate, may more than offset declines in consumption of ice cream, fluid milk and cream, canned citrus juices, lamb and mutton.

Reviewing the food outlook for next year commodity by commodity, here's what the government economists foresee:

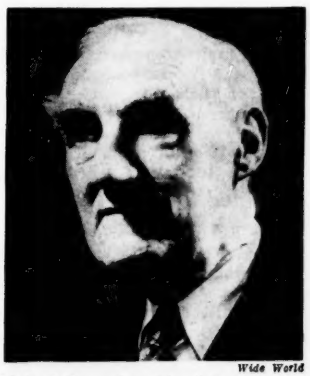
Dairy products—Supplies of milk and manufactured dairy products in 1950 will probably increase from the near-record low per capita figure of 742 lb. in 1949. Retail prices probably will be slightly lower.

With smaller exports in 1950, and a domestic decline in milk and cream consumption per capita, supplies of milk for manufactured dairy products "will be increased significantly." The greatest expansion is likely to come in butter—already under government price support.

Fats and oils—Domestic consumption of food fats "may" increase slightly, with supplies at least as large as this year, and a prospect of slightly lower prices to consumers.

Most of the increase is likely to be in butter and lard. Consumption of margarine might decline from the 5.6 lb. per person of 1949. Shortening consumption may be no greater next

(Industry News Continued)



Wide World

Nobel Award to Food Leader

Sir John Boyd Orr, former chief of the Food & Agriculture Organization of the U. N., is the 1949 recipient of the Nobel Peace Prize. Sir John, widely remembered in the U. S. for his efforts to formulate a program that would bring the world's food supply into balance, is now president of the World Movement for World Government.

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Because assured customer satisfaction for your seasoned or flavored food product can be achieved easily with Spicealate (water-solublized) flavors, Essential Oils or Oleo Resins.

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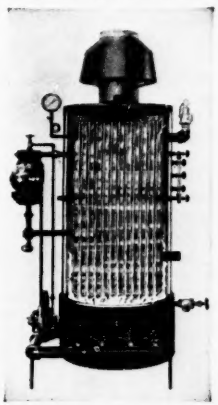

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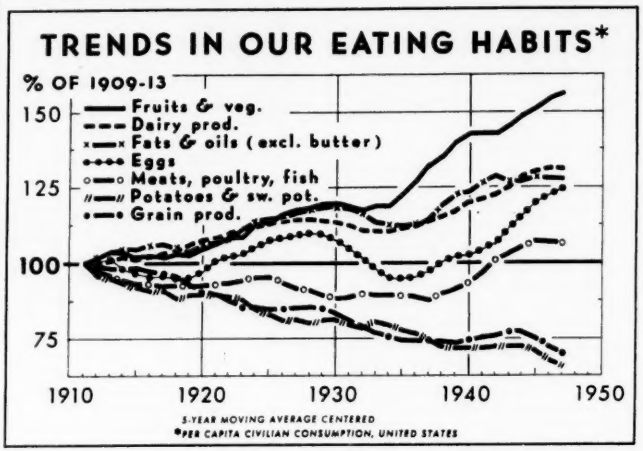

Gains and Losses

The steady rise in fruit and vegetable consumption and the "prosperity" curve for meats and eggs are vividly shown on this chart prepared by BAE. Grains and potatoes, however, have declined through depression and war.

year, because of the competition of lard at relatively lower prices.

The domestic market for other food fats and oils—cottonseed, soybean, corn, peanut, olive, and coconut oils—will probably be about the same next year as this. Output may decline a bit but total output will still be at record levels.

Fruit—Supplies of most fresh and processed fruit will be larger this winter and spring than a year ago. Main exception will be grapefruit. Prices of deciduous fruits are expected to be lower than a year ago. In the spring, orange prices will be lower than a year ago, grapefruit prices about the same.

Dried fruit supplies will continue larger, but domestic consumption will not increase so government price supports on these commodities will continue.

Canned deciduous fruits will be in greater supply in the 1949-50 season. Larger packs of peaches, pears, apples and applesauce, sweet cherries and plums will about offset smaller packs of other fruits.

Total consumption of canned fruits is expected to be up about 5 percent. Supplies of canned citrus fruits will probably be smaller as a result of the smaller grapefruit crop, and increasing use of oranges for frozen concentrate.

Consumption of frozen fruits, juices, and berries is expected to continue at about the 3-lb.-per capita rate of 1948 and 1949. This rate is bolstered by swift rise in output of frozen citrus concentrates, mostly orange. Production in 1949 was 4 times that of 1948, and more expansion is expected next year.

Vegetables—Canned vegetable supplies during the first half of next year are smaller than this year. Supplies of frozen vegetables will be up.

Grains—Near-record supplies are expected all along the line, especially of wheat, corn, and rice.

Sugar—Demand in 1950 isn't expected to be much different than that for 1949—somewhere between 90-95 lb. per capita, compared with 96 lb. this year. World production is expected to be about the same—about 22 percent greater than prewar.

Stroud Jordan Award Founded By AACT

The Stroud Jordan Award, in the form of a medal to be given annually to an individual who has made an outstanding contribution in the field of candy technology, has recently been established by the American Assn. of Candy Technologists in cooperation with the American Sugar Refining Co.

This award honors the memory of Stroud Jordan, whose death in 1947 deprived the food industry of one of its outstanding technologists. During his many years' association with the confectionery industry, Dr. Jordan embodied much of his knowledge and experience in numerous technical papers, which appeared in Food Industries and other technical publications. His books *Confectionery Prob-*

lems, 1930; *Confectionery Standards*, 1933; *Chocolate Evaluation*, 1934, and *Confectionery Analysis and Composition*, 1946, are standard reference works for confectioners.

Members of the Award Committee include W. L. Campbell, MIT; G. R. Cowgill, Yale; H. A. Neville, Lehigh; and A. W. Thomas, Columbia. Katheryn E. Langwill, Drexel Institute of Technology, Philadelphia 4, is chairman of the award committee and all correspondence on nominations should be addressed to her. Nominations will be accepted until January 15.

Food Earnings Pick Up Though Sales Vary

A much improved earnings picture is presented in recent food company reports for varying periods. In each of the six cases noted here, earnings are up from the corresponding period last year. Two of the companies also report higher net sales, two others indicate a drop, while the remaining two do not report on sales.

Gerber Products Co. showed a 15 percent increase in net sales, which reached $22,186,211 for the six months ending September 30. For the same 1948 period, sales were $19,231,794. Earnings amounted to $1,841,095, compared with $1,238,791 a year ago.

Reporting for the third quarter of 1949, General Foods earned $6,990,936, compared with $6,534,434 in the third 1948 quarter. Net sales were $114,322,810, as against $112,282,111. Nine months earnings for General Foods amounted to $21,349,153, compared with $20,431,995 in the same period last year. Net sales for the nine months were $354,704,183, compared with $336,849,513 for the nine 1948 months.

Net sales for Beatrice Foods Co., for the three months ending August 31, dropped to $51,032,312, from $54,761,-

(Industry News Continued)

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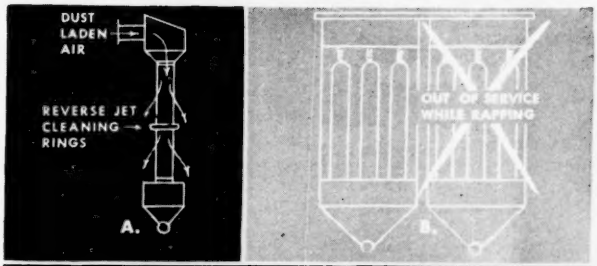
FOR DUST FILTER CLEANING!



NEVER A SECTION OUT OF SERVICE

DAY "Autoclean" DUST FILTER

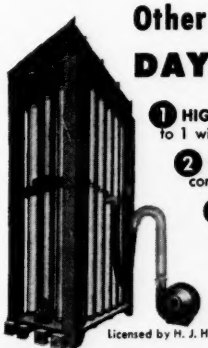
Fifty-eight plants in the food industry are now securing continuous dust recovery with constant air volumes through installation of the new **DAY** "Autoclean" Dust Filter.

The **DAY** "Autoclean" Dust Filter provides *continuous-automatic operation* . . . completely eliminating cleaning shut-downs! This results in the low constant back pressures and uniform air volumes necessary for maximum dust collection efficiency.

Figure A shows how reverse jet cleaning rings travel slowly up and down the tubes of the **DAY** "Autoclean" Dust Filter blowing high pressure air back through the felt in a *continuous cleaning action* with a maximum cloth area loss of only 1¼%.

Most other types of filters require shutting down sections for cleaning. This may amount to 50% of the cloth area as indicated in Figure B.

Other Advantages of the DAY "Autoclean" Dust Filter:



1. **HIGH AIR TO CLOTH RATIOS**—10, 15 or 20 to 1 with uniform low back pressures.
2. **CONSTANT AIR VOLUME**—Assured by continuous cleaning of all filter tubes.
3. **HIGH CLEANING EFFICIENCY**—Gentle reverse jet cleaning permits use of quality felt filtering cloth.
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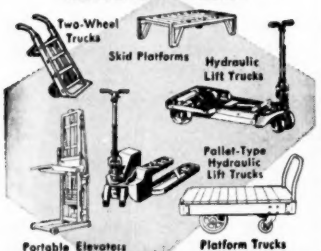

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586 in the like 1948 period. Earnings, however, rose to $1,393,385 in the 1948 quarter, from $946,470 a year ago.

Standard Brands showed a drop in net sales for the first nine months of 1949. Totaling $193,543,776, the net sales figure compares with $214,034,858 for the same 1948 period. Consolidated net income for the period reached $6,100,505 in 1949, compared with $5,806,761 last year. Consolidated net income for the third quarter alone was $2,348,737, compared with $787,520 a year ago.

Best Foods, Inc., reporting its quarter ending September 30, showed consolidated net earnings of $1,689,895, compared with $1,379,815 in the same 1948 quarter.

Corn Products Refining Co. reports nine months earnings of $10,407,382, compared with $7,356,238 for the same 1948 period.

New Tariff Cuts Affect Many Food Products

Food processors checking through the new tariff reductions negotiated by the U. S. government at Annecy, France, generally find no sweeping concessions. But specific items are of interest to particular sections of the industry, since they point to: 1. New competition from the imported products, or 2. lower costs on imports needed in producing their own finished products. Some of the items on which U. S. duty rates will be lower are these:

Chocolate and confectionery machinery, olive oil, molasses and sugar syrups, meat extracts, canned beef and corned beef, sheep's milk cheese for grating, and vermouth.

Similarly, the new agreement resulted in some lowered tariffs on U. S. food exports, which may be of some help to exporters in selling abroad. Examples of some of the food products on which duties were lowered by various countries are the following:

Fresh fruit; raisins, prunes, and other dried fruits; canned vegetables and soups; dairy products; and meat and fish products.

Involving only 10 countries other than the United States, the Annecy negotiations were a sort of small-scale second round of the Geneva tariff reductions arranged between the U. S. and 22 more important world trading countries, in Switzerland in 1947. The Geneva rates are already in effect.

However, the tariff reductions negotiated on specific food imports with the 10 Annecy countries also apply to those products imported from the 22 countries that participated in the Geneva agreements.

The countries involved in the Annecy agreements are Denmark, Dominican Republic, Finland, Greece, Haiti, Italy, Liberia, Nicaragua, Sweden, and Uruguay.

The countries that took part in the Geneva conference are Australia, Belgium, Brazil, Burma, Canada, Ceylon, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon, Luxemburg, Netherlands, New Zealand, Norway, Pakistan, Southern Rhodesia, Syria, Union of South Africa, and the United Kingdom.

The tariff cuts will go into effect in 1950, as the countries complete their ratification of the agreements. The figures on value of imports reflect this difference: Some countries that export to the U. S. are not parties to the program, hence do not get the favorable tariff rate that applies to imports from the 32 nations whose products will now receive the lower U. S. tariff rate.

FOOD TARIFFS Before and After Annecy

Commodity	Rate of U. S. Duty Pre-Annecy	Rate of U. S. Duty After-Annecy	1948 U. S. Imports Participating Countries	1948 U. S. Imports Total All Countries
Cream of tartar	5c./lb.	3¼c./lb.	$92,290	$143,396
Olive oil, pkgs. less than 40 lb	8c./lb.	4¾c./lb.	6,991,984	7,459,079
Olive oil, pkgs., 40 lb. or more	6½c./lb.	3¼c./lb.	1,692,484	8,105,899
Chocolate & confectionery machinery and parts	27½%	15%	333,855	360,821
Food grinding and cutting machines	27½%	15%	165,460	176,275
Molasses, sugar syrups	0.25c./gal.	0.155c./gal.	1,761,028	1,761,028
Cuban molasses, sugar syrups	0.1c./gal.	0.1c./gal.	.....	.....
Saccharides	50%	25%	1,285	1,285
Pork sausage, except fresh	3¼c./lb.	1¾c./lb.	.....	.....
Meat extract	7½c./lb.	3¾c./lb.	3,403,847	4,391,256
Canned beef, corned beef	3c./lb.	3c./lb.	14,587,385	41,373,013
	20% min.	15% min.		
Beef & veal, pickled & cured	3c./lb.	3c./lb.	853,270	962,443
	20% min.	10% min.		
Blue-mold cheese	5c./lb.	3c./lb.	36,875	1,428,905
	25% min.	15% min.		
Sheep's milk cheese for grating	5c./lb.	3½c./lb.	2,973,552	3,060,781
	25% min.	17½% min.		
Antipasto, value over 9c./lb	30%	15%	30,270	39,372
Macaroni, made without eggs	1½c./lb.	1c./lb.	310,858	329,727
Macaroni, made with eggs	2c./lb.	1½c./lb.	70,760	70,904
Vinegar, except malt vinegar	8c./pf. gal.	4c./pf. gal.	26,507	30,001
Citrons, prepared	6c./lb.	4c./lb.	8,261	8,261
Orange and lemon peel, dried or in brine	2c./lb.	1c./lb.	20,975	21,895
Orange and lemon peel, candied	8c./lb.	4c./lb.	6,095	6,095
	(Cuba 6.4c./lb.)			
Figs, value 7c./lb. or more	40%	20%	293,429	510,349
Lemons	2½c./lb.	1¼c./lb.	193,045	193,482
Olives	20–30c./gal.	15c./gal.	.....	.....
Vermouth, containers of 1 gal. or more	50c./gal.	31¼c./gal.	2,841,714	2,858,148

Wide World

Very Short Ribs of Beef

If the meat packers were only looking for meat animals with less fat, this could be a solution. Trouble is there is less meat, too. Anyway, it's one of those dwarf cattle found by a North Dakota cattle dealer in a canyon "somewhere in the Western U. S."

Sugar Refining Hours Are Still Too High

An average of 7.01 man-hours was required to refine a ton of cane sugar in 1946. In 1939 it was only 6.26 man-hours.

This is disclosed by U. S. Bureau of Labor Statistics in a report showing trend in man-hours involved in refining cane sugar from 1939 to 1946. It covers 15 of the 19 refineries in this country, which turned out three-quarters of the industry's production.

More than half the total man-hours for 1946 was due to direct production labor, 3.72 man-hours per ton. Of this, 2.29 went for refining operations and 1.43 man-hours for packaging (about 40 percent). Indirect labor—receiving, maintenance, warehousing, shipping, and materials-handling—accounted for 3.29 man-hours.

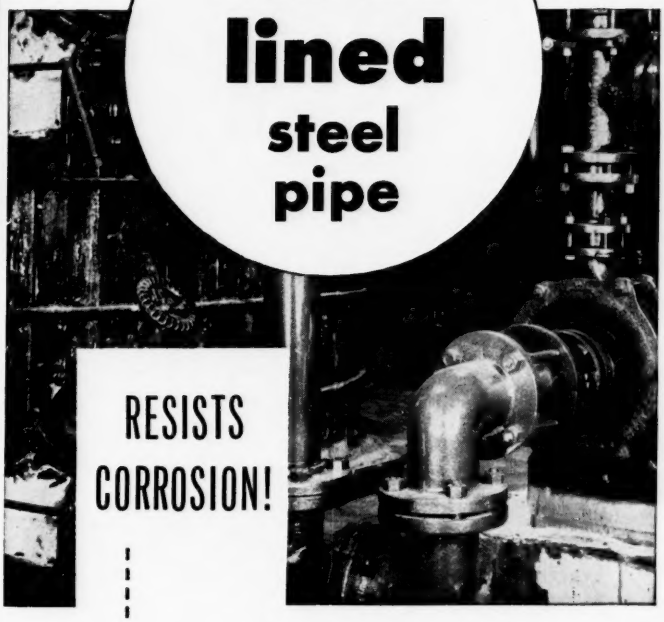
Thus, the average man-hour requirement in 1946 for hard, white granulated sugar refining was about 12 percent above 1939 for the same output.

Heinz Safety Record

A new national safety record for the canning and preserving industry has been established by the Pittsburgh factory employees of H. J. Heinz Co. By working 1,329,455 man-hours without a lost-time injury, the Heinz workers passed the old mark, set by themselves in 1940.

(Industry News Continued)

saran lined steel pipe



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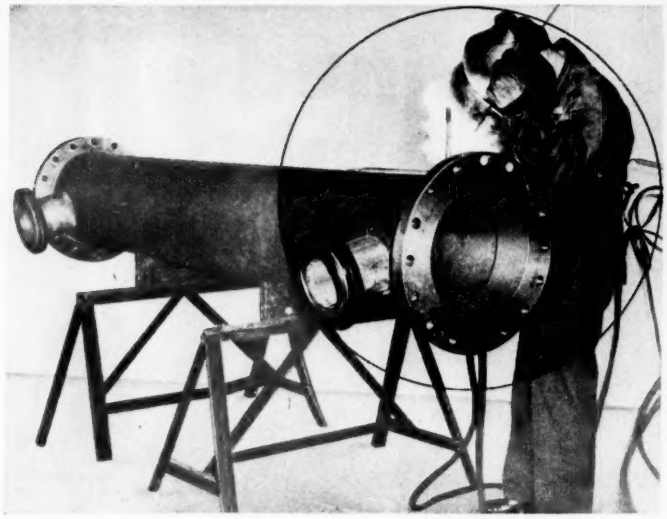

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HEAT EXCHANGERS

Wide World

"Breath" Analyzer

Safe storage lengths for fruits can be determined by this electronic oxygen analyzer, developed at University of California, Los Angeles. Flow meters register amount of gases "inhaled" and "exhaled" by fruit. Ideal "breathing" rate appears to be attained at 55 deg. F.

PROCESSING

Research and Practice Reported by Egg Men

In his report to the fall meeting of the National Egg Products Assn. Oct. 8 in Chicago, Dr. O. J. Kahlenberg presented several projects being worked on by the association's research laboratory. Those for 1949 and 1950 include:

1. Continuation of study of factors affecting the whipping qualities of egg whites. 2. Participation in the government study to develop quality standards and specifications for eggs, particularly frozen eggs. 3. Cooperative assistance to the Forest Products Laboratory in work on new packages for dried whole eggs. 4. Development of plans for a plant manager and laboratory personnel school to be conducted during off-season months.

5. Continuation of cooperative agreement with the poultry branch, USDA to study (a) washing and sanitizing of shell eggs; (b) control of breakage, bacterial count and cost of breaking out shell eggs, and (c) keeping qualities of washed shell eggs in comparison with those of clean, fresh, high-grade unwashed eggs under current marketing conditions and cold storage. Objective is to cut down economic losses estimated at $30,000,000 per year resulting from marketing of improperly cleaned eggs.

Dr. Kahlenberg also reported completion of a preliminary study on the value of various syrups as sucrose replacements in frozen egg mixtures for use in bakery products.

Use of quaternary ammonium compounds in egg processing plants as cleansing and sanitizing agents will be permitted by Federal and State authorities, if properly handled, it was reported.

Fred Vinall, Vinall Egg Co., Adelaide, Australia, expressed preference for brine freezing of canned eggs over the tunnel method, and he cited the advantage of precooling the mixed eggs to 40 deg. F. prior to canning. In commenting on the development of 15 percent "rots" in shell eggs shipped to London, he said the difficulty was traced to the use of cleaning machines and to the practice of cleaning soiled eggs with damp cloths on the farms and in egg packing plants.

Avoids "Rots"

Immersion of the shell eggs in 146.6 deg. F. water for 113 sec. and drying in a current of cool air preliminary to coating with oil and packing eliminated the development of "rots" and prevented enlargement of air cell and loss of edible quality.

He recommended that all eggs arriving at the packing plant be taken from cases, washed, pasteurized in hot water, and oiled in continuous steps before grading and repacking. The objectives of such low-cost treatment are to give eggs longer commercial life, improved market value, and provide protection against the sudden breakdown of quality through mishandling.

Mr. Vinall cited his company's experience of several years in hot-water washing of eggs before breaking, as compared with pasteurizing after breaking. Pasteurizing in the shell results in lower bacterial count, improved drainage of edible whites from the shells, and increased protection against contamination. In the method used, two men can easily feed 1,500 doz. shell eggs per hour into the system. No further handling is necessary until eggs are weighed into cans for freezing. An installation of the egg handling system is to be made near London, Ontario. There, test runs may be made by government and private concerns, and visitors will be welcome. An increased yield of 5 percent in egg meats over hand breaking is expected, plus lower handling costs.

Roy W. Lennartson, assistant director, poultry branch, USDA attempted to explain and justify the price support programs of the past four years. He cautiously expressed the possibility that Congress will pass legis-

(Industry News Continued)

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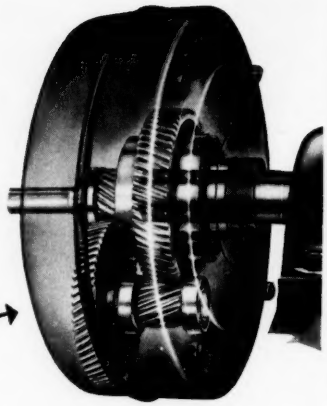

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. . . how to save by standardizing my slow-speed drives. Please rush my free copy of The American Drives Data Book.

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lation for price support at discretionary levels for 1950, the discretionary level to be set by the Secretary of Agriculture. He stated: "Should this occur, the support program could then be used as an instrument for stabilizing prices at such levels as would assure an adequate production of eggs from year to year, but at a production level which would not continue to create unreasonable surpluses."

Canadians Get Results From Poultry Study

The food chemistry section of the Division of Applied Biology has completed an investigation into the effects of processing factors on the quality of frozen poultry, according to the National Research Council of Canada.

It was found that: A 90-sec. interval between killing and semi-scalding was beneficial; a 4-sec. dip in semi-scald water at 128 deg. F. is most effective in removing feathers with least damage to bird; plucking machines should not exert a downward force of more than 11 lb. on carcass if excessive damage is to be avoided; and eviscerating appreciably extends keeping time in chilled and frozen storage.

Rutgers Dairy Courses Set for January

Two short courses in the field of dairy manufactures will be offered by the College of Agriculture, Rutgers University, early next year. They are a course in ice cream making, to be held January 9 to 19, and a market milk course, January 23 to 26. Both are free to residents of New Jersey.

Students in the ice cream making course will learn the composition, testing, processing and freezing of ice cream mixes, using the college's new continuous freezer. An all-day conference will be held January 20 when students will have a chance to sit in with representatives of ice cream companies and hear discussions on current developments and problems of the industry.

The market milk course will follow the same pattern. There will be lectures and laboratory work on production and processing of milk, and a conference with commercial processors and distributors January 27. Those who take this course may also take the state milk tester's license examination.

Conferences of industrial representatives with students and instructors were started last year, and they proved

Wide World

"Big" Olive Harvest

Tehama County, Calif., claims to produce more than 70 percent of the super colossal olives grown in the U. S. No doubt about their being big. Something appetizing about them, too.

---

exceedingly popular. Dr. Joseph Leeder, associate professor of dairy manufactures at the State University, is the leader of the ice cream making course and conference. Dr. S. A. Lear, associate professor of dairy manufactures, is leader of the market milk course and conference.

Further information about the courses can be obtained from Prof. Frank G. Helyar, director of resident instruction at the College of Agriculture, New Brunswick, N. J.

F&DA Activities

Comparatively few formal actions have taken place in the food standards category of Food & Drug Administration since last reported. However, some recent legal and administrative actions have been newsworthy.

Provision for interstate experimental shipments of foods that do not comply with standards has been made by a statement of general policy on Oct. 12. A number of food industry representatives, familiar with food standards procedure, collaborated with Food & Drug Administration in the preparation of the statement. No applications had been filed up to early November, although two or three were rumored to be in course of preparation.

Constitutionality of part of one section of the Food, Drug, & Cosmetic Act of 1938 has been questioned by manufacturers of Nutrilite Food Supplement, a vitamin and mineral preparation. Principal question at issue was multiple seizure of the product,

(Industry News Continued)

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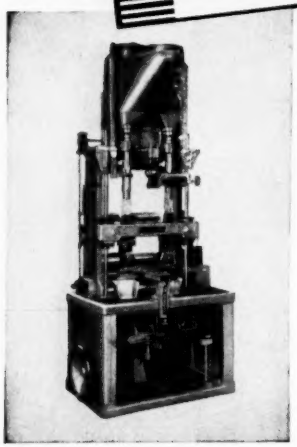

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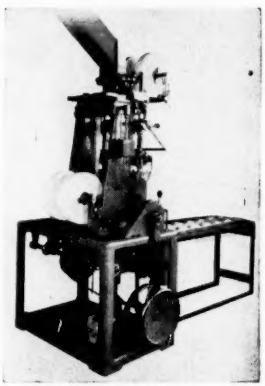

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Wide World

Michigan Squash

When this 83-yr.-old Michigan lady planted squash seed from Oregon, she hoped for a good healthy return. But she hadn't counted on this 100-lb. job that required a wheel-barrow for hauling from garden to kitchen.

in ten different parts of the country, without any hearing being offered to the manufacturer prior to such seizures. The manufacturer was upheld by a three-judge court in Washington, D. C. Appeal by the government goes directly to the Supreme Court and will probably be heard around the first of the year. The part of section 304 (a), which was held to be unconstitutional, was the last phrase in the second exception to limitations. This was worded ". . . or would be in a material respect misleading to the injury or damage of the purchaser or consumer."

Economic adulteration of a food received court hearing for the first time before a jury in the Camden, N. J. District Court. Defendant was Bireley's Orange Beverage, following a seizure in 1945. The government won the case after a three-week trial, the decision coming from the jury after about 90 minutes deliberation. Section 402 (b) (4) was the basis for the action, in that artificial color had been added to give the beverage the appearance of orange juice, and orange oil, lactic acid, and sugar had been added to give the flavor of orange juice, without adequate warning to the consumer that it was not orange juice.

A consumer survey was introduced by the government in prosecuting the case, as well as technical testimony by F&DA chemists, and samples of the alleged misleading advertising that accompanied the beverage. Wording of the economic adulteration section

is ". . . if any substance has been added thereto, or mixed or packed therewith so as to make it appear better or of greater value than it is."

Canned oyster litigation reached a decision in the Supreme Court on October 24, when petition to review the Ninth Circuit Court of Appeals decision was denied.

Canned shrimp labels no longer need bear the statement, "production supervised by U. S. Food & Drug Administration", even when this optional supervision is employed. Formerly it had to be declared if the production was supervised. It is estimated that this relaxation of the regulations could affect about half of the canned shrimp packers, all of whom are located in the New Orleans district of F&DA.

Tolerances for poisons and deleterious residues on or in fresh fruits and vegetables will be discussed in hearings beginning Jan. 17, if all interested parties cooperate with Presiding Officer Bernard D. Levinson. He has written a letter to all known interested persons and organizations asking for a preliminary indication, when possible, of the names of people who wish to testify, the subjects on which they wish to speak, and the approximate time required to present their cases. Those who do not reply to this preliminary invitation will, of course, be heard when the hearing opens, but a better tentative schedule can be established if the response to Mr. Levinson is fairly complete.

USDA Grade Standards

Standards for grades of a number of foods were amended by Production & Marketing Administration of the U. S. Department of Agriculture recently. Among these have been actions on oranges and grapefruit from California and Arizona, dates, certain carcass beef, canned pineapple juice, and sediment disks for milk and milk products.

Grapefruit grown in California and Arizona have been covered by U. S. standards for many years. An amendment was published on page 6153 of the Oct. 11 *Federal Register*. It was also proposed that the amended standards become effective during November. Interested persons were given until Nov. 10 to submit written comments.

Oranges grown in California and Arizona have also been covered by U. S. standards since 1941. The proposed amendment was published on page 6181 of the Oct. 12 *Federal Register*. No date was indicated by which the amendments were to become effective, but interested persons were given until Nov. 11 to file written comments

(Industry News Continued)

Can't
- CREEP
- WEAVE
- JUMP

The continuous, uniform speed, perfectly flat surface, open mesh feature and resistance to acid, heat and cold make La Porte Conveyor Belting adaptable to every process in food manufacture—plus packaging and shipping.

In addition, it is the most sanitary conveyor belting available—easily and quickly sterilized with steam or scalding water, without removal from friction drum. Furthermore, it is built to last.

You can save money with La Porte Flexible Steel Belting. It is available in any length and practically any width. Write your dealer at once for literature and prices.

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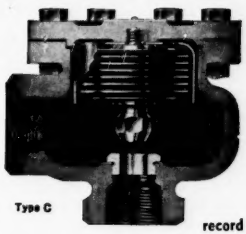
Nicholson Steam Traps

CUT Processing Time 30%

for Food Packer



Records of a recent installation of Nicholson steam traps, by a leading food packer, show they cut cooking time 30%. For example, one operation was shortened from 65 to 45 minutes. Nicholson units keep equipment full of live steam because: 1) they operate on lowest temperature differential; 2) have 2 to 6 times average drainage capacity. Also record low for steam waste; and maximum air-venting capacity. Widely specified for preventing damage to thin gauges of heat transfer units; eliminate cold blow in unit heaters.

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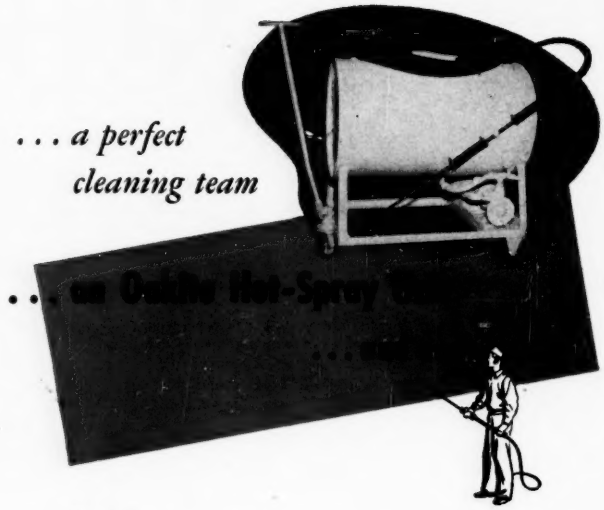

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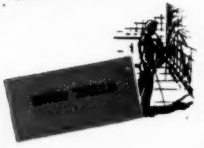
. . . an Oakite Hot-Spray Unit . . .

NO more time-consuming hand-scraping or wire-brushing to clean walls, floors and equipment. Now all you do is switch on the Oakite Hot-Spray Unit, open up spray-gun valve and begin to wet down surfaces with hot cleaning solution.

Wheel-mounted, this mechanical spray-cleaner can be piloted around your plant for quick, easy operation wherever cleaning or paint-stripping is required.

Unit develops and delivers a controllable combination of the three most essential cleaning elements—heat, pressure and detergency. Delivers 1¾ gallons of hard-hitting cleaning solution per minute at 30 pounds pressure.



The Oakite Hot-Spray Unit has almost unlimited possibilities! Using specialized Oakite cleaning materials you can remove food residues from equipment, floors, tanks. You can strip paint with it. Many meat packers use it to derust and descale belly boxes and the like.

Use the Oakite Hot-Spray Unit and ONE man to speed up your cleaning chores, simplify them and REDUCE YOUR CLEANING COSTS. Your local Oakite Technical Service Representative will gladly give you details on models No. 482 and 451. Or write address below for descriptive data.

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INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

Sugar Lit Up

Here is a 60-in. anti-aircraft searchlight used in Hawaii to prevent formation of tassels on sugar cane. Experiments indicate that a bright light applied for as little as one minute during the night will stop the tasseling. Practice has added as much as a ton per acre to the cane-sugar yield.

with the fruit and vegetable branch, PMA.

Dates are now covered by amended U. S. standards (the second issue), effective upon publication on page 6395 of the Oct. 20 *Federal Register*. All interested parties indicated to the Department of Agriculture that the proposed modifications "will be fair and equitable to all date producing areas". They also "strongly urged the issuance of the foregoing revised standards at the earliest date practicable in order that they may be used in the present marketing programs."

Carcass beef standards for the proposed new grades designated as "Regular" and "Commercial", a division of a single grade formerly known as "Commercial", have aroused considerable interest, according to the Secretary of Agriculture. "It is now deemed desirable to extend until further notice the time for filing such comments" as interested persons wish to express. These should be filed with the livestock branch of PMA, according to a notice on page 6530 of the Oct. 26 *Federal Register*.

Canned pineapple juice is the subject of a proposed revision of U. S. grade standards. Changes which are proposed will be found on page 6567 of the Oct. 28 *Federal Register*. (These standards should not be confused with the Food & Drug Administration standards of identity, quality, and fill of container which have been an-

(Industry News Continued)

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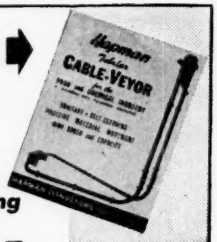

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nounced as the subject of a hearing to be held October, 1950.)

Sediment standards for milk and milk products have been formally promulgated by the Department, to become effective Dec. 2. The purpose of these standards is said to be to "facilitate future reference by the Department to any sediment content, on a quantitative basis, that may be found in milk and milk products." The standards consist of ten disks prepared in accordance with the procedure published by American Public Health Association, representing sediment quantities ranging from zero to 2.50 milligrams.

Schedule of Events

January

16–19—Society for Advancement of Management and American Society of Mechanical Engineers, 1st plant maintenance conference and exposition, Auditorium, Cleveland.

17–20—National Potato Chip Institute, 13th annual conference and exhibit; Netherlands Plaza Hotel, Cincinnati.

22–31—Joint Convention & Exposition; Auditorium, Atlantic City, N. J. 22–27—National Food Brokers Assn. 28–31—Canning Machinery & Supplies Assn. 28–31—National Canners Assn.

23–24—Canadian Food Processors Assn., annual convention; Ritz-Carlton Hotel, Montreal.

23–Feb. 4—Pennsylvania State College, short ice cream course for plant men; School of Agriculture, State College, Pa.

26–27—National Dairy Council, annual meeting-winter conference; La Salle Hotel, Chicago.

26–28—Refrigeration Research Foundation, annual meeting; Edgewater Beach Hotel, Chicago.

27—National Pickle Packers Assn., mid-winter meeting, Roosevelt Hotel, New York City. 28—Rally, Chalfonte-Haddon Hall Hotels, Atlantic City, N. J.

28-31—National American Wholesale Grocers Assn., annual convention; Ambassador Hotel, Atlantic City, N. J.

30–Feb. 2—American Warehousemen's Assn., 59th annual meeting; Edgewater Beach Hotel, Chicago.

31–Feb. 4—National Association of Frozen Food Packers and National Preservers Assn., all-industry convention; Congress Hotel, Chicago.

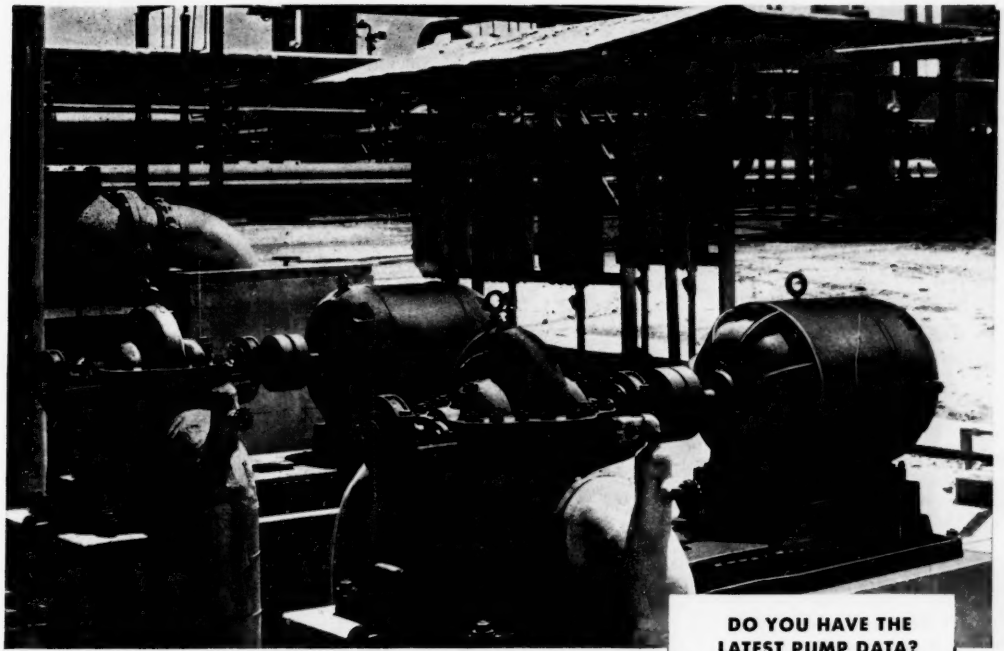
February

6–18—Pennsylvania State College, short course on market milk and milk supervision; School of Agriculture, State College, Pa.

11–14—Institute of American Poultry Industries, 20th annual fact-finding conference; Municipal Auditorium, Kansas City, Mo.

20–25—Pennsylvania State College, short course in testing milk, cream and other dairy products; College of Agriculture, State College, Pa. —*End*

WHERE THERE'S A PUMP IN YOUR PLANS



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Here are a few of the services Peerless Pumps perform. Request data by Bulletin number.

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Fire Protection	B-1500
Chemicals and Oils	B-810
Vaporous Liquids	B-2201
Butane-Propane	B-2200
Boiler Feed	B-301
Sewage and Solids	B-154
Hi-Pressure	B-310
Acids and Caustics	D-2400
Process Services	B-803
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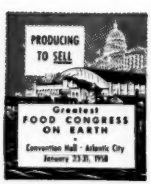

IF we don't hear from you, we'll see you in Booth C-14! We're going to show you how Taylor Control Systems for canning plant applications —from semi-automatic to completely automatic—are all designed to do one important job: *to help you "Produce To Sell" by keeping your costs down and your quality up.*

You'll see Transaire*—Taylor's new force-balance temperature transmitter with a speed of response to changing temperatures never before thought possible.

You'll also see an animated flow sheet pointing up the places where you can profitably use instrumentation: a retort control panel with time and temperature venting according to latest NCA recommendations; a working density control system; and the latest in accurate Jam and Jelly Kettle Control.

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Don't be surprised to see our instruments in a lot of other booths too, because more and more equipment manufacturers are showing their products Taylor-Equipped. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

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TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

Changes in Food Supplies

Production

MARGARINE production in September totaled 71,719,000 lb., which compares with 76,209,000 lb. produced in September, 1948, and a 1944–48 September average of 55,113,000 lb.

CREAMERY BUTTER output ran up to 114,240,000 lb. during September, the highest level for the month since 1943. Production was 19 percent above September, 1948 and 5 percent above the 1943–47 average. August–September decline was only 12 percent, compared with drops of 18 percent last year, and 12 percent for the five-year average.

ICE CREAM production, estimated at 45,135,000 lb., in September, was 17 percent under output during September 1948 and 14 percent under the five-year average. Also down seasonally, ice cream dropped 31 percent between August and September, compared with only 16 percent last year and a five-year average of 15 percent.

AMERICAN CHEESE produced during September totaled 74,270,000 lb., a new record high for the month. Output exceeded September 1948 by 5 percent and was 9 percent above the five-year average. The August–September drop was 15 percent, compared with a 19 percent decline last year and a five-year average decrease of 16 percent.

GREEN PEAS packed in 1949 were equal to 23,408,000 cases on a 24/2's basis, a little over the 23,356,000 cases in 1948.

Stocks

CANNED PEAS in canners' hands October 1 amounted to 18,378,266 actual cases, compared with 21,008,277 cases held on the same date a year ago, according to National Canners' Assn.

CANNED ASPARAGUS stock amounted to 1,338,641 cases on October 1, in the NCA compilation. On the same date last year, stocks totaled 990,271 cases.

CANNED SWEET CHERRY stocks amounted to 1,052,000 cases (24/2½'s basis) on October 1, as against 366,000 cases on Oct. 1, 1948. Total pack, according to NCA, was 1,678,000 cases (24/2½'s), compared with 839,000 cases packed in 1948.

CANNED RED PITTED CHERRY stocks totaled 1,556,160 actual cases, in the NCA compilation, compared with 1,428,269 cases on that date last year Total pack amounted to 3,445,323 cases this year, compared with 3,552,210 cases last year.

CANNED BABY FOOD stocks, on October 1, reached 47,815,000 doz. cans, in the NCA estimates, which compares with 39,796,000 doz., on the same 1948 date.

Storage

FROZEN FISH AND SHELLFISH held in storage October 1, totaled 150,607,730 lb., 10,500,000 lb. more than was held on the same date last year, and well over 4,000,000 lb. more than was held September 1.

COOLER occupancy increased during September, reaching 60 percent on October 1. This was up 7 points from September, in contrast with a 2 percent seasonal decline in the five-year averages.

FREEZER space, however, remained at its lowest ebb for the date, standing at 67 percent filled. While this was an increase of 1 point over September 1, occupancy reached a new low for October 1, being 2 points below the previous record, made in 1940.

Indexes

The commodity index on foods compiled by the *New York Journal of Commerce* was 176.7 for the week ending November 12, which compares with 177.6 for the previous week; 177.5 for October, and 192.0 for November, 1948.

Business Week's index of business activity stood at 159.4 for the week ending November 5. A week earlier it was 159.3; a month earlier, 164.6, and a year earlier, 197.9.

CONSTRUCTION

	Pending (thousands)	Total Awarded Nov. (thousands)	Total Awarded 1949 (thousands)
Bakery	$818	$150	$7,351
Beverages	605	723	15,191
Canning and Preserving	.....	.....	115
Cold Storage	.....	.....	2,559
Confectionery	450	499	1,147
Grain Mill Products	.....	.....	32,571
Ice, Manufactured	300	200	75
Meats and Meat Products	455	281	8,012
Milk Products	3,668	242	8,067
Miscellaneous	.....	.....	14,858
	$6,296	$2,095	$89,946

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Baby Food Hits Jackpot!

A LEADING processor reports his fortified baby food an instant success. One low-cost nutritional fortifier pepped up product... sparked advertising and sales.

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VITAMIN D PRODUCTS: Hy-Dee Irradiated Dry Yeast, Irradiated Dry Yeast Type 700-H; Viosterol (Irradiated Ergosterol).

NATURAL B-COMPLEX PRODUCTS: Pure Primary Dry Yeast (brewers' type), Bee-Flex Products, Yeast Extracts, Yeast Extract and Liver, Fortified Yeast with Iron.

MALT EXTRACTS AND SYRUPS: A complete line of dry and liquid diastatic and non-diastatic malt extracts and malt syrups.

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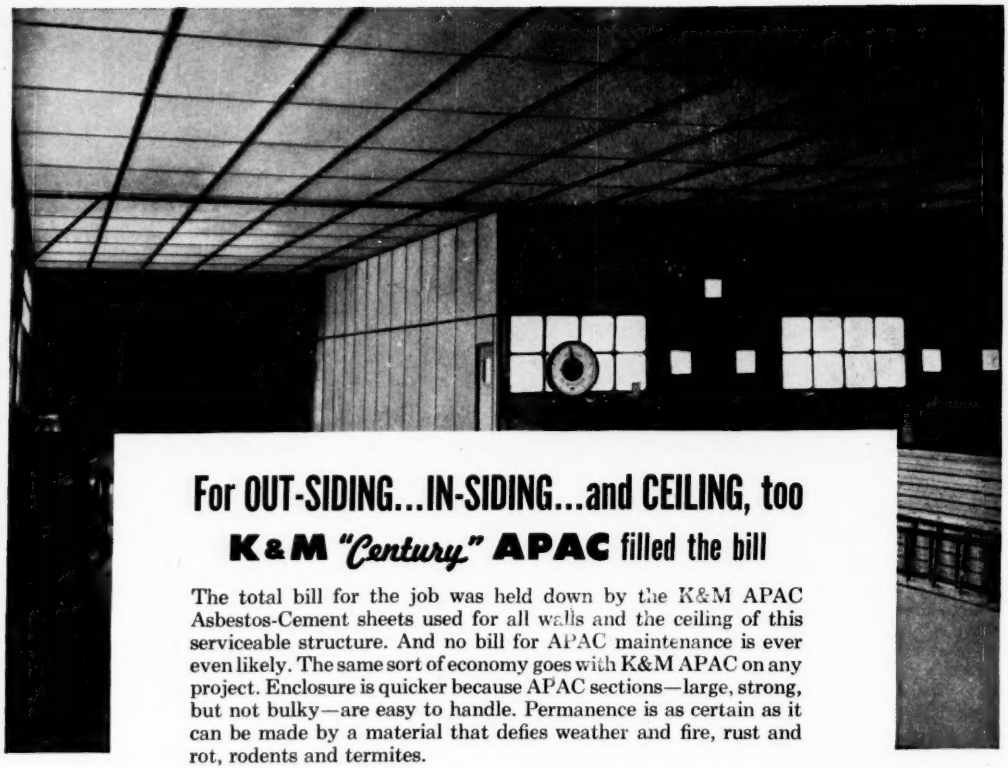

For OUT-SIDING...IN-SIDING...and CEILING, too

K&M *"Century"* APAC filled the bill

The total bill for the job was held down by the K&M APAC Asbestos-Cement sheets used for all walls and the ceiling of this serviceable structure. And no bill for APAC maintenance is ever even likely. The same sort of economy goes with K&M APAC on any project. Enclosure is quicker because APAC sections—large, strong, but not bulky—are easy to handle. Permanence is as certain as it can be made by a material that defies weather and fire, rust and rot, rodents and termites.

The K&M APAC Asbestos-Cement formula gives you a tough, attractive, money-saving material for panels, partitions, sheathing, shaft casings, bins—all flat areas. Apply APAC over insulation board, wood studs, solid wood sheathing, steel or wood girts. You don't even need to paint APAC! Standard thicknesses: $\frac{5}{16}$"—$\frac{1}{4}$"—$\frac{3}{8}$"... Standard sheet size—easy to cut on the job—is 4' x 8'. For name of your nearest distributor, and all particulars, write to us.

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Keasbey & Mattison has made it serve mankind since 1873

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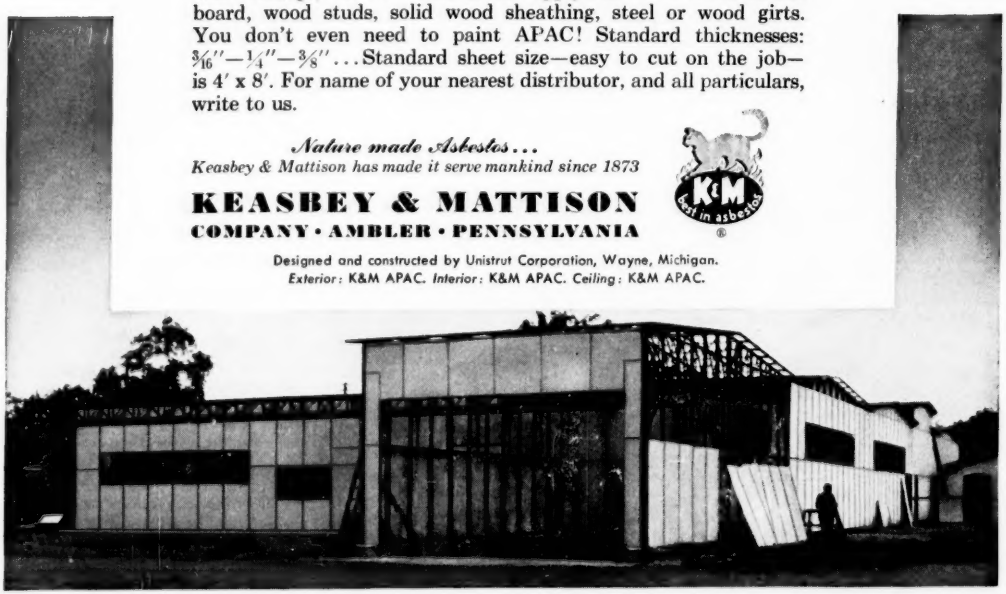
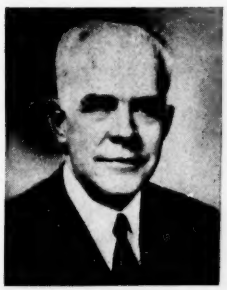
Designed and constructed by Unistrut Corporation, Wayne, Michigan.
Exterior: K&M APAC. *Interior:* K&M APAC. *Ceiling:* K&M APAC.



Men, Jobs, Companies



H. N. RILEY, vice-president of manufacturing, research and quality control with H. J. Heinz Co., Pittsburgh, has been promoted to executive vice-president. He started with firm as a bacteriologist in 1912.

NOBLE STORMONT, formerly director of research and laboratories of Food Materials Corp., Chicago, has been named director of research, laboratory and production divisions of Citrus Products Co., Chicago.

HERMAN A. KATZ has been elected a vice-president of Jacob Ruppert Brewery, New York. For the past 14 yr., he has been sales agent for the firm in the New England territory and holds a leading sales record.

AMBROSE E. STEVENS has been elected to the board of directors of Minute Maid Corp., New York, packer of fresh frozen citrus juices. He is also vice-president in charge of sales of this recently renamed firm.

Industry

Arrowhead & Puritas Waters, Inc. recently completed modernizing the materials handling operations at its Los Angeles plant. Cost of the project was estimated at $250,000.

Bowman Dairy Co., Chicago, is constructing a one-story addition to its ice cream plant.

Bruckmann Brewing Co., Cincinnati, has been purchased from the Bruckmann family by Herschel Condon of the same city. The brewery has been valued at over $1,000,000. Deal includes a distributing agency in Indianapolis and warehouses in Lexington, Ky., Hamilton, Springfield, Columbus and Lima, Ohio.

B. C. Ice & Cold Storage, Vancouver, British Columbia, recently opened a new $2,500,000 frozen food plant.

Canada & Dominion Sugar Co. has installed new diffusers and dryers in its Chatham, Ontario plant.

Catelli Food Products Co. has opened a new $250,000 plant at Lethbridge, Alberta, Canada.

Hygrade Food Products Corp. has moved its general traffic office from the Livestock Exchange Building, Chicago, to Detroit.

D. E. Wirebrenner Co., Hanover, Pa., producer of "Deweo", "Dutch Treat", and "Penn Pakt" brand foods, recently celebrated its 75th year in the food processing business.

Kingan & Co. announces plans to establish a meat processing plant in Seattle. This will be the third company branch located on the West Coast.

Lever Brothers Co. announces plans to move its headquarters from Cambridge, Mass., to New York City. Included in the firm's expansion program will be erection of a $3,000,000 technical research laboratory at Edgewater, N. J., and a $2,000,000 margarine plant at Hammond, Ind.

Liberty Cherry Co. is constructing a new plant in Toronto for the production of maraschino cherries.

Mill-O-Mat International, Ltd., is being incorporated in Toronto, Ontario.

National Syrup Products Co., Chicago, has purchased the Lady Corinne label rights, goodwill, and raw material inventories of Martin Food Products, Inc., Chicago, producer of jams, jellies and preserves.

Charles E. Hires Co. has sold its entire interest in Hires Sugar Co., Cuba, for an estimated $1,250,000.

S & R Fine Foods, Inc., Streator, Ill., manufacturer of mayonnaise and salad dressing products, announces that half interest in the corporation has been purchased by James H. Black, Chicago food executive.

C. A. Swanson & Sons, Inc., Omaha, announces appointment of the following officers: Board chairman, Mrs. C. A. Swanson; president, G. C. Swanson; executive vice-president and treasurer, W. C. Swanson; vice-president, M. C. Pollock; and secretary, R. L. Holmes.

Airline Foods Corp. has moved offices and plant of its Max Ams-H. Baron Division from New York City to a new plant in Linden, N. J.

Personnel

Miss Aurelia Celeste Bernard has been appointed to the food technology department of The Emulsol Corp., Chicago. She will be engaged in the frozen and dried egg research and development program.

Ralph M. Bohn has been appointed vice-president in charge of research with the Antle Co., Avondale Estates, Ga. He will devote his attention to field of antioxidants in foods.

Marshall J. Brandon has been elected president of the North Carolina Bottlers Association. He succeeds George Hunt, who becomes a board member.

George M. Clarke has been named executive vice-president and manager of the Dairy Products Institute of Texas.

(Men, Jobs, Companies Continued)

A GLUTTON FOR WORK.. this Paper!

Magic chemical crystals available everywhere can easily prevent moth damage. Highly volatile, these crystals evaporate if their elusive substance is not trapped in a secure package. Yes, there's a special Rhinelander paper right enough to do this tough job.

The world of commerce . . . from modest store to giant office . . . finds convenience and economy in the use of a vast variety of interleafed business forms. Many of these *require and employ* the high transparency and fine writing quality of Rhinelander's Manifold Parchment.

Oh, so good! A new idea in prunes . . . so plump and tender you eat them like candy. The secret is a stepped-up moisture content which, however, is very difficult to retain in the package. Rhinelander has exactly the right answer in a paper of superb moisture resistance.

*Glassine and Greaseproof the functional papers that do so many tough jobs well.

Rhinelander PAPER COMPANY

IN THE LAND O' LAKES • RHINELANDER, WISCONSIN

WILLIAM B. TYLER, vice-president and general counsel of California & Hawaiian Sugar Refining Corp., Ltd., San Francisco and Crockett, has been elected president of the California Manufacturers Assn. He succeeds Fred B. Ortman, president of Gladding, McBean & Co.

Dr. Gerty F. Cori, authority in the study of metabolism of sugar in the human body, was one of the twelve distinguished women who recently received an honorary degree from Smith College.

J. S. Duncan has been named president and general manager of Oregon Foods, Inc., McMinnville, Ore.

Richard Ehrlich was recently appointed laboratory director of American Butter Institute, Chicago. He succeeds the late J. C. Brown.

William F. Eldridge is the new general sales manager of all divisions of The Huron Milling Co., New York City.

Dr. Saul Frances, former member of the bacteriology department, college of physicians and surgeons, Columbia University, has become director of Wells Laboratories, Inc., Jersey City, N. J.

S. E. Frohock is now director of the new department of merchandising research established by the Kraft Foods Co.

Mrs. Iris G. Gillespie has been appointed home economist with American Can Co., Hamilton, Ontario.

Robert B. Mayer, vice-president of Maurice L. Rothschild & Co., Chicago, has been elected a director of Consolidated Grocers Corp.

Vincent Sauchelli, director of agricul-

(Men, Jobs, Companies Continued)

Announcing

—a new food that more smoothly unites good things to eat

A *dependably uniform*, plastically soft food fat that is more than *90% surface-active monoglyceride* is now available in quantity. It is made from refined cottonseed oil.

That unique 90% monoglyceride content gives Myverol Distilled Monoglycerides, **Type 18-85,** remarkable emulsifying effectiveness in comparison with 30% to 40% monoglycerides.

You'll find that a dough or batter requires a *small fraction of the quantity of previously available monoglycerides you've been using*. If you manufacture shortening, you'll be astonished at savings on overage you can now avoid because Myverol Monoglycerides—*taste-free, odor-free, catalyst-free, soap-free*—can be added directly to your deodorized product.

Like to make up a trial batch of your product with it? Like to work out the arithmetic with respect to your product picture? We'll be glad to send you a sample, price quotation, and specification sheet.

"MYVEROL" IS A TRADE-MARK.

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Pickles are TASTIER when Seasoned by FRITZSCHE

For years, FRITZSCHE'S carefully standardized spicing compounds have been used by pickle processors to achieve the ultimate in fine, uniform flavor. Whether for Dills or Garlic Type Dills, Sweet Pickles or Sour, the most successful producers have found our specially developed spice oils the most economical and satisfactory means of processing for *better* flavor. Write for Flavor Catalog No. F-15.

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BRANCH OFFICES *and* *STOCKS. *Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, O., Cleveland, O., Dallas, Tex., Detroit, Mich., *Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., *St. Louis, Mo., *Toronto, Canada and *Mexico, D. F.
FACTORY: *Clifton, N. J.*

FMC FLAT TOP STEELBELT

Made of No. 302 (18-8) stainless steel

We'll gladly send a sample of this all-purpose STEELBELT, used for conveying every kind of product. See for yourself how rugged it's made, how easy to splice, how flexible in operation, how easy to clean.

FOOD MACHINERY AND CHEMICAL CORPORATION

ANDERSON-BARNGROVER DIVISION General Sales Office SAN JOSE 5, CALIFORNIA

SEATTLE • PORTLAND • LOS ANGELES • HOOPESTON, ILLINOIS (SPRAGUE-SELLS DIVISION)

tural research of The Davison Chemical Corp., Baltimore, has been elected chairman of the division of fertilizer chemistry of the American Chemical Society. He succeeds Dr. J. B. Hester of the Campbell Soup Co.

Arthur L. Schiel, executive vice-president of H. J. Heinz Co., has relinquished his post in accordance with the firm's retirement plan. He had been with the organization 35 years.

J. K. Southerland, operator of a feed and broiler business, Batesville, Ark., has started construction of a new poultry dressing plant to handle 6,000 fowl daily.

L. W. Haas has been elected president and **E. E. Hanson**, executive vice-president, of W. E. Long Co., Chicago.

Orville R. Hawkins, formerly manager of Floridagold Citrus Corp., has been appointed production manager of the Auburndale, Fla., plant of Clinton Industries, Inc.

Charles E. Steinebrey, Jr., has been named manager of the Pure Milk & Dairy Co., Tiffin, Ohio. The firm was recently acquired by the Beatrice Foods Co., Chicago.

C. Howard Sweat, of Pasco Products Co., Orlando, has been elected president of the Florida Canners' Association.

Richard S. Taussig was elected executive vice-president of the American Molasses Co., New York. He is a grandson of the company's founder.

Robert E. Watson, president of Weston Biscuit Co., Inc., has been elected president of The Biscuit & Cracker Manufacturers' Association.

Orval H. Ause, a former president of Chicago dairy technology society, has been appointed vice-president of H. C. Christians Co., Chicago. Joining the company in 1935, he has been manager in charge of butter production since that time.

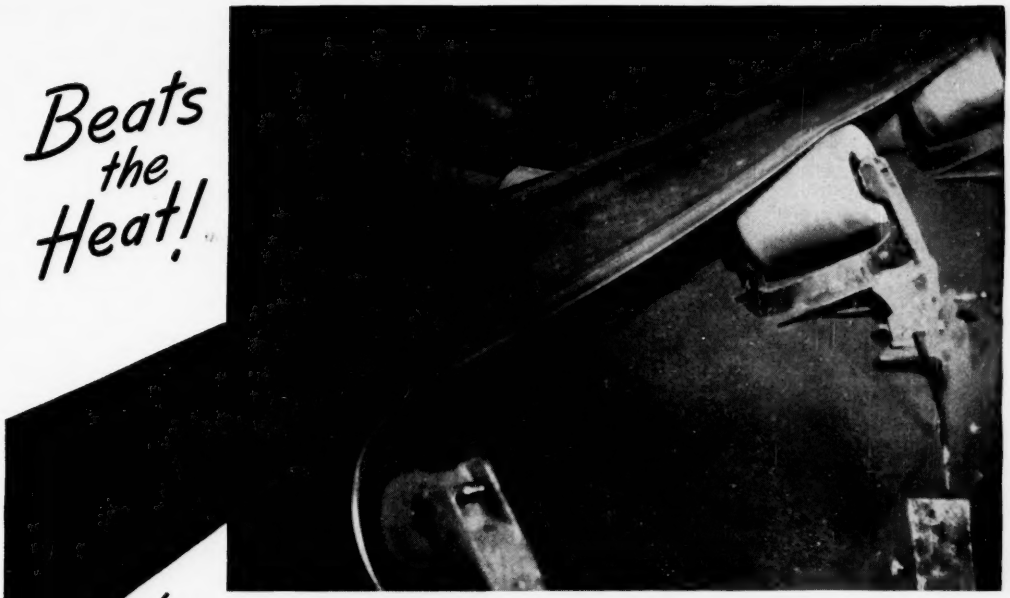
Associated Industry

American Machine & Foundry Co., New York, N. Y., has purchased Union Machinery Co., Joliet, Ill., manufacturer of bakery equipment.

Dominion Viscose Products Co. is reported making plans for construction

(Men, Jobs, Companies Continued)

Beats the Heat!



New **RUBBER-GLASS REPUBLIC CONVEYOR BELT**

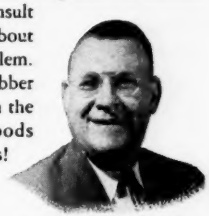
Solving problems is our business.

For example, this new Republic belt carries hot cargo for foundries. Red-hot pieces of jagged metal in tons of smoldering sand ride from shake-out racks to reclaiming stations on this rubber-glass belt. Temperatures often run as high as 400°F. and the work is continuous.

Operations like this meant only trouble until Republic Rubber and its Milwaukee Distributor, Shadbolt & Boyd Company, entered the picture. Life expectancy of ordinary "hot material" belts was just ten weeks and sometimes less.

Today, the trouble is over. Republic's new belt made of glass fabric and specially compounded rubber is on the job and, after more than a full year of continuous service, the belt rolls on. It's still pliable. The belt remains unbroken and good for a lot more service!

Success stories like this are common at Republic Rubber since we specialize in mechanical rubber goods only. An experienced Republic Distributor is located near you. Consult him or write us today about your most difficult problem. Remember, Republic Rubber has been *the* specialist in the mechanical rubber goods field for nearly fifty years!



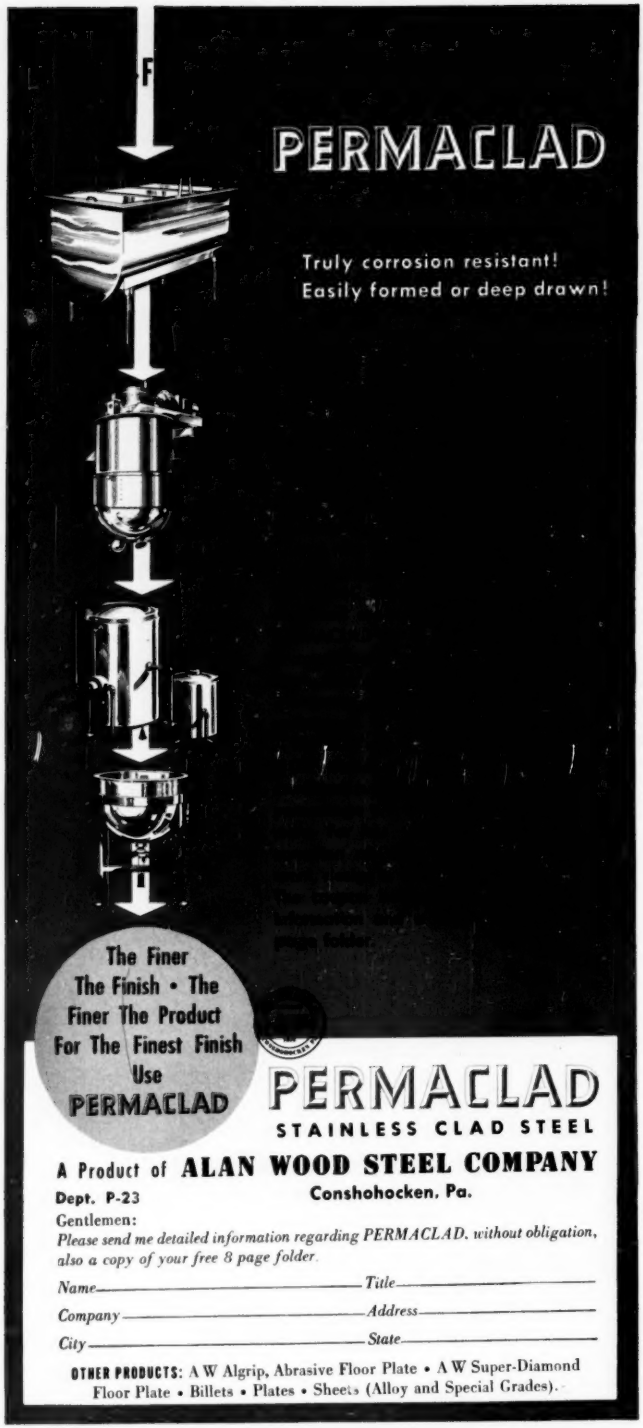
Howard F St George, Vice Pres.
Shadbolt & Boyd Company
Milwaukee, Wis.

★ ★

Pioneers in the use of COLD RUBBER

REPUBLIC RUBBER DIVISION
LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN, OHIO
Lee Deluxe Tires & Tubes • • Conshohocken, Pa.

MECHANICAL RUBBER GOODS BY
REPUBLIC RUBBER DIVISION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Truly corrosion resistant!
Easily formed or deep drawn!
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OTHER PRODUCTS: A W Algrip, Abrasive Floor Plate • A W Super-Diamond Floor Plate • Billets • Plates • Sheets (Alloy and Special Grades).

of a plant in Toronto, Canada, for making cellulose casings for meat products.

Clark Equipment Co. has built a new factory at Jackson, Mich.

Electro-Chemical Supply & Engineering Co., Paoli, Pa., announces a complete reorganization. New officers of the firm are: Dr. C. R. Payne, president; J. W. Grant, vice-president and sales manager; W. A. Sesher, treasurer and production manager; and W. L. Sheppard, Jr. advertising and export sales manager.

Graver Water Conditioning Co., New York, N. Y., announces appointment of Henry T. Sulcer as general manager; Edward W. Welp as assistant general manager; and Vincent J. Calise as head of the firm's technical division.

Jas. P. Marsh Corp., Skokie, Ill., has reorganized its sales and manufacturing operations.

C. J. Patterson Co., Kansas City, Mo., has appointed Charles Baker, Jr., as sales and service representative.

Patterson Foundry & Machine Co., East Liverpool, Ohio, announces opening of a new plant at Toronto, Canada.

Deaths

J. T. Disteldorf, 53, supervisor of Armour & Company's power plant, Chicago—in Chicago, Oct. 12.

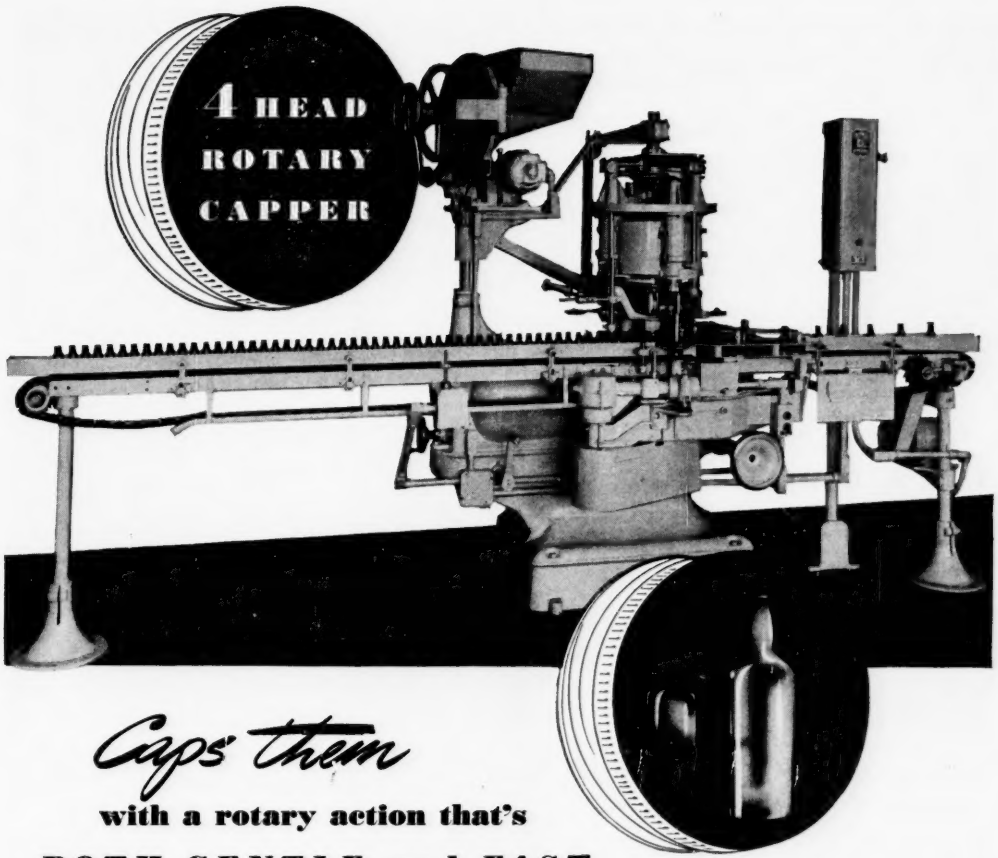
Henry C. Chase, 54, manager of sales and development department, E. J. Brach & Sons, Chicago—in Chicago, Oct. 11.

Ignatius J. "Ig" Goode, 57, sales executive of White Cap Co., Chicago —at St. Joseph's Hospital, Chicago, Oct. 6.

T. Gunter Smith, 47, Southeastern division manager of Walworth Co., Atlanta, Ga.—while attending a convention in Monroe, La., Oct. 25.

Carl A. Swanson, 70, president of C. A. Swanson & Sons, Omaha—in Chicago, while attending annual meeting of National Poultry, Butter & Egg Assn., Oct. 9.

Frederick M. Switzer, 84, founder and head of Switzer Candy Co., St. Louis —in St. Louis, Oct. —*End*



Caps them

with a rotary action that's

BOTH GENTLE and FAST

Here's a capper with a "delicate touch" that offers money-saving protection against damage or breakage of glass and caps.

Easy does it on Pneumatic's Four Head Rotary. It's smooth, it's speedy, and very, very efficient because of these design advantages (1) Continuous rotary intake that handles glass GENTLY (2) Positive, gentle transfer of caps from hopper to bottle (3) Two-speed chucks accommodate both C. T. and lug-type caps (4) Single crank adjusts height of both the cap feed and the capping head (5) No gears to change—variable speed drive is standard equipment (6) Sensitive chucks apply caps to uniform, predetermined tightness. Send for complete bulletin on Pneumatic Capping Machines.

PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Ave., Quincy 71, Massachusetts. Branch Offices in New York, Chicago, Los Angeles, San Francisco and Seattle.

PNEUMATIC

PACKAGING AND BOTTLING MACHINERY

SUMMER DELICACIES

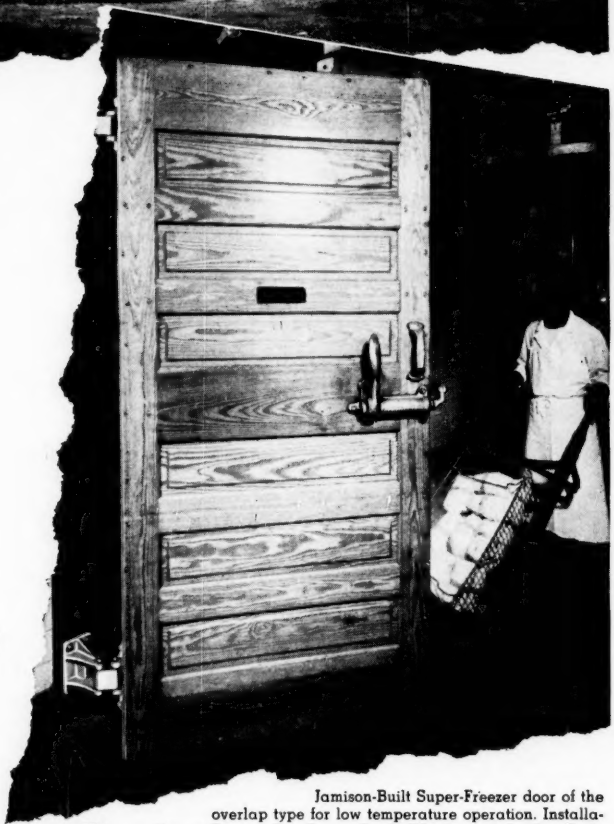
for Next

Winter's Dinner

In thousands of frozen food plants throughout the country the summer's crops pass through Jamison doors to await use next winter.

The frequent operation and heavy use given to these doors call for the rugged hardware and tight sealing action of Jamison-built doors. Standard doors are available for all ordinary temperature ranges and door openings—also, for such applications as can and crate passing, keg passing, ice cream can passing, ice chutes.

For detailed information on Jamison Cold Storage Doors request Catalog 175.



Jamison-Built Super-Freezer door of the overlap type for low temperature operation. Installation at Country Life Frozen Foods, Westbury, L. I., New York.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Oldest and largest builder of cold storage doors in the world

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U.S.A.

What Readers Think

Philippines Offer Important Market For American Processed Foods

Mr. Editor:

With a population close to 20,000,000, the Philippines represent a most important market for American processed foods.

Hungry for years, the Filipinos now open cans of American foods whose contents were completely unknown to the average consumer before the war. This has come about through the enormous stocks of Army & Navy surplus made available here after the war. Semi-luxuries such as jams, jellies, meatloaves, fruit mixture, puddings and gelatine desserts are some of the foods they have sampled. And today these items are being imported through regular channels, in ever-increasing amounts. In spite of the import controls which went into effect last January, most lines of staples, with the exception of canned tomatoes, have doubled or tripled.

Imports of sardines jumped from 3,000,000 to 20,000,000 pesos ($10,000,000) the first six months of 1949. Oranges and apples come in by the millions of pounds, as do dried beans. And this in a country where the daily average wage since the war is not too close to $1. In the cosmopolitan areas, $2 would be conservative.

The Philippines have imported large quantities of rice. But it is hoped to produce the requirements locally within the next few years. Guavas, sown by birds, are a valuable source of vitamin C; 125,000 tons of this fruit are being harvested in one small area in Cagayan Valley. Production of guava jelly, fruit juice, syrup and pure crystals for gelatine desserts is just waiting for some enterprising food processor. Native guavas are sweeter than most.

The local pack of pineapples runs into 1,500,000 cases. Tons of edible oils and cooking fats are consumed and manufactured in the Philippines.

Among foods processed here in small volume is coconut syrup. The Philippines could supply the world with coconut syrup of good quality. The formula is secret, and competition is negligible.

A most important contribution could be made to the Far East by combining American surplus skim milk and Philippine refined coconut fat. The American housewife would have her butter, the people of the Orient would benefit immeasurably from cheaper milk. Added vitamins would insure the properties needed for health and growth. I believe this would be hailed throughout the Orient as a signal contribution to the economy of the Oriental peoples, and prove that American interest in a well-fed Asia is substantial.—*Janet M. Walker, Tropic Products Co., Manila, P. I.*

Volatile Fruit Concentrates Now Are Tax Exempt

Mr. Editor:

Because of the active commercial interest in our process for production of volatile fruit concentrates, we have endeavored to keep industry promptly informed of any significant developments which pertain to this subject.

Since these volatile fruit concentrates are produced by distillation and generally contain 0.5 percent or more of alcohol, they have been subject to the usual taxes and restrictions on such products. However, Bill H.R. 5270, which exempts volatile fruit concentrates of reasonable alcohol content from certain taxes and other restrictions, was signed by the President on August 17 and became Public Law 240, 81st Congress. This amends Subchapter E of Chapter 26 of the Internal Revenue Code.

The regulations pertaining to this amendment define the limits of alcohol content and the conditions under which volatile fruit concentrates may be produced and used. These regulations have now been published in the *Federal Register* of September 27, 1949, pages 5869 to 5879 inclusive. Copies of this issue may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. The regulations became effective on the date of publication in the *Federal Register*.

Inquiries concerning the new code should be addressed to Mr. Carrol E. Mealey, Deputy Commissioner, Alcohol Tax Unit, Treasury Department, Washington, D. C.—*P. A. Wells, Director, Eastern Regional Research Laboratory, Bureau of Agricultural & Industrial Chemistry, U. S. Department of Agriculture, Philadelphia 18.*

"Cost Cutting" Compliment

Mr. Editor:

We received some very interesting information by way of your November, 1948, issue concerning food plants, and we are again gratified to note in your October, 1949, number, a thorough discussion of the timely and critical cost cutting issues which confront all of us.

We note in your foreword that more articles of this type will appear in subsequent issues. The purpose of this letter is to compliment you on your fine articles in the October issue.—*Willard W. Gregory, Treasurer, Hitchner Biscuit Co., West Pittston, Pa.*

New Data on Potato Storage

Mr. Editor:

We were pleased with the attractive way you set up our article, titled "But How Good Will They Be After Storage?" in the September issue of Food Industries.

Since the preparation of this article, we have found that a reconditioning or desugaring temperature of 70 deg. F. is more satisfactory (for potatoes) than 60 deg., since the reaction is more rapid. We also find that 80 deg. has no advantage over 70 deg., and we therefore consider 70 deg. about optimum for this purpose.

You may be interested in knowing that we are continuing the work with several different varieties of potatoes—including some of the very new varieties—to determine those that can be readily reconditioned for commercial processing, especially chip making. We are finding some of the very new varieties superior to many of the older ones in this respect. We feel that it is important to know the varieties that can be reconditioned, because most of the raw stock available during the winter and early spring has been held at temperatures too low for processing without this treatment.—*R. C. Wright, Physiologist, Bureau of Plant Industry, Soils & Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.*

GMCs "Deliver the Goods"

Food, furniture and fuel oil . . . the tree, the turkey and the toys . . . almost everything that moves by motor truck makes its contribution toward a Merry Christmas.

Total truck tonnage has increased 120 percent in the past ten years and GMC has been a pacemaker in this rapid rise in truck transportation. Now better equipped to "deliver the goods" than ever before, tough, truck-built GMCs offer powerful, valve-in-head gasoline engines or famed, 2-cycle Diesel models . . . strong, sturdy chassis with rugged axles, springs and brakes . . . big, wide-vision, easy-riding cabs . . . outstanding performance and dependability, unexcelled efficiency and economy.

There's a better-built GMC for all hauling jobs . . . for every transportation task . . . Christmas time and all the time!

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

GMC
GASOLINE • DIESEL
TRUCKS

Turkeys trek to the table in a refrigerated body mounted on a GMC chassis. The 300 series 1½-ton model illustrated is ideal for hauling poultry and perishable produce. And GMC's complete line, ranging from Pickups to giant Diesels, provides trucks that are specially suited to all food transport.

Books

Food Science Primer

RELATED SCIENCE FOR THE FOOD TRADES. *By B. E. Silver. State Education Department, University of the State of New York, Albany 1, N. Y.,* 1949. 163 *pages; 8x10¼ in., loose leaf, paper. Price,* $1.95.

Here is a work described by its publishers as a study guide—a series of instructional units that will familiarize students and apprentices in the food fields with the scientific principles underlying methods of preparing, processing and preserving foods.

The book appears to be all that is claimed and is probably one of the best of its kind for newcomers in food processing. A careful study of these pages should make competent, more useful workmen of all the non-technically trained members of any food plant staff.

Food Labels

STANDARDS AND LABELS FOR CONSUMERS' GOODS. *By Jessie V. Coles. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y.,* 1949. 556 *pages; 6½x9½ in.; cloth. Price,* $5.

Most aspects of standards and labels for consumer goods are covered in this highly informative volume. And foods take up a substantial portion of the book.

Seven sections take in the interests of the consumer: Labels as they exist today, basic concepts of standards, how standards are used by producers, problems involved in getting standards, grade labeling, and the present status of standards and labels.

A highly superficial polemic in favor of compulsory grade labeling may mar the book for many high quality food producers, but it comprises only a few paragraphs and can be readily skipped as it offers nothing new.

Food Values and Composition

ROSE'S LABORATORY HANDBOOK FOR DIETETICS, 5TH EDITION. *By Clara Mae Taylor and Grace McLeod. Published by The Macmillan Co., 60 Fifth Ave., New York, N. Y., 1949. 358 pages; 5¾x8½ in.; cloth. Price, $5.*

Problems involved in the calculations of food values and food requirements, along with the construction of dietaries, are discussed in the light of developments since the 4th edition of this work in 1937. Likewise, the various tables have had to be completely reorganized in order to incorporate the more recent quantitative data on food composition.

Four parts make up the book. They include: A summary of the functions of food and food requirements of the individual; problems of dietary calculations; new and revised reference tables, and tables of food values and composition.

Crop Chemistry

BANANAS. *By Harry W. Von Loesecke. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y.,* 1949. 189 *pages; 6x8¾ in.; cloth. Price,* $4.50.

This is the first book in a series now in preparation on economic crops. The series is designed to give the food processor and the food grower some understanding of the chemical composition and biochemical behavior of foods, with particular stress on the chemical variations in different crops of the same commodity.

As pointed out in an introduction to the series, the lack of even a superficial knowledge of the difficulties facing the processor has limited the usefulness of those persons dealing with the various aspects of crop production. Likewise the processor's ignorance of growers' problems has caused even greater difficulties.

This first book is largely a bread review of the literature on the biochemistry of bananas and their products. It is written for those engaged in fundamental research, who may here find gathered data on results already accomplished as well as information on work now in progress.

British Processing

PRACTICAL CANNING. *By Arthur Lock. Published by Food Trade Press, Ltd., 7 Garrick St., W. C. 2, London, Eng., 1949. 246 pages; 5¾x8½ in.; cloth. Price, £2.*

This is an English primer on canning, but it contains a great many tips for food plant workers. The book is based on practical methods used in England and other countries and is intended as a guide in the control of production and general engineering.

The author has had a varied experience in the U. S., Canada, Australia, South Africa and England. He has engaged in can making as well as in canning. And he has put that experience between the covers of this book.

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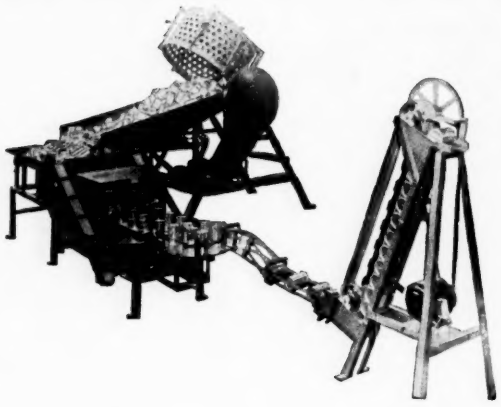

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the office staff, however, it will be a helpful addition to any company library.

Government Publications

ROLE AND SOURCES OF VITAMIN B_{12} IN THE NORMAL MAMMAL. *By A. M. Hartman, et al. Bureau of Dairy Industry. BDIM-Inf-76. Mimeographed.*

UNION WAGES AND HOURS: THE BAKING INDUSTRY, JULY 1, 1948. *Bureau of Labor Statistics. Bulletin No. 954. Price, 20c.* A detailed analysis of wages, classified by job names and descriptions.

THE PASTEURIZATION OF MILK. *By C. J. Babcock. Department of Agriculture. Leaflet No. 177. Mimeographed.* A popular interpretation urging pasteurization.

CONSUMPTION OF FOOD IN THE UNITED STATES, 1909-48. *Bureau of Agricultural Economics. Miscellaneous Publication No. 691. Price, 65c.* An elaborate statistical analysis with interpretation of present diet make-up and of trends over 40 years.

METHODS OF ARTIFICIAL RESPIRATION. U. S. Coast Guard document CG 139. Price 10c. Valuable leaflet for plant employee training.

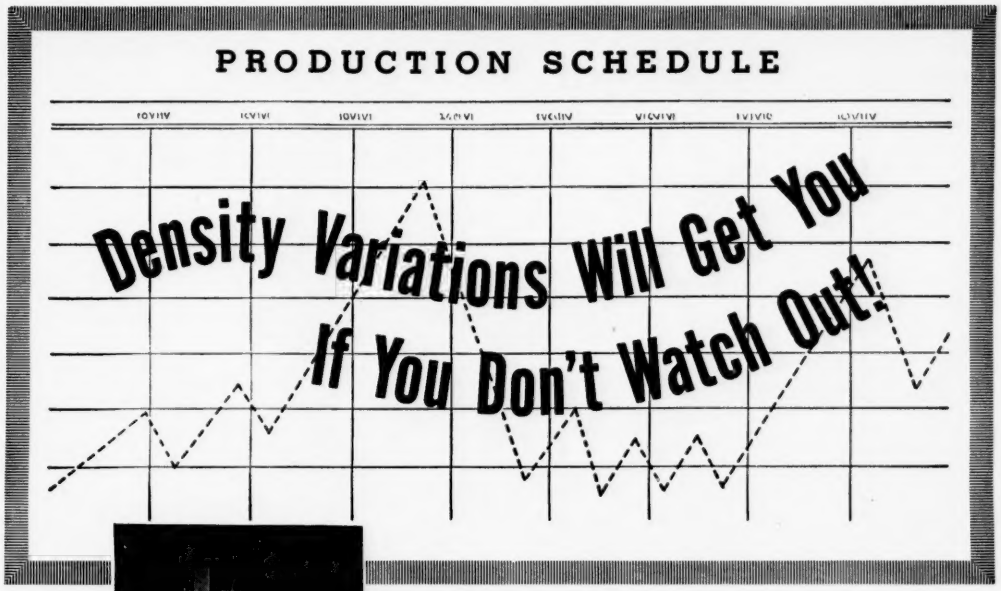
LIST OF PREPACKAGERS OF FRESH FRUITS AND VEGETABLES. U. S. Department of Agriculture unnumbered document. July 1, 1949. Mineographed.

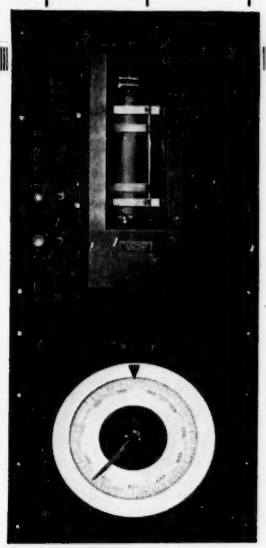
PRE-PEELED POTATOES FOR COMMERCIAL USE. By R. L. Olson and R. H. Treadway. Bureau of Agricultural & Industrial Chemistry AIC-246. Mimeographed. Review of present practice, with bibliography.

CONSUMPTION OF FOOD IN THE UNITED STATES, 1909-48. U. S. Department of Agriculture, Miscellaneous Publication No. 691. An elaborate statistical summary giving commodity details.

CANE SUGAR REFINING, 1939 TO 1946. Bureau of Labor Statistics, LS 50-981. A detailed statistical analysis showing trends in man-hours expended per ton.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue. —End





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Can Washing and Drying

Up to 300 cylindrical cans a minute can be washed and dried by unit detailed in 4-page Bulletin 49-40. How it works is covered in photos, text and dimensional drawings. Can turner is also featured.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

Bakery Pan Cleaning Equipment

Performance and mechanical details of various type machines for washing and drying bakery pans are contained in 8-page Catalog 100.—*Bakery Div., Industrial Washing Machine Corp., New Brunswick, N. J.*

Roll Slitters and Unwinders

Apparatus for cutting and unwinding rolls of packaging materials is described and illustrated in 4-page Bulletin 549—*Johnstone Engineering & Machine Co., Parkesburg, Pa.*

Vibration Control

Transmission of machine vibrations is reported eliminated by use of equipment discussed in 4-page Catalog LK 551. Photos of typical installations, dimensional data and specifications are included.—*The Korfund Co., Inc., 48-15 32nd Place, Long Island City 1, N. Y.*

Plant Heating

Articles on plant heating and barge transportation are among features in house organ, *Dravo Review*, Vol. 4, No. 2.—*Dravo Corp., Dravo Building, Pittsburgh 22.*

Band Knives

Bread, cake, pies, fish, and meat can be cut with band knives described in 4-page folder. Price list is included.—*L. S. Starrett Co., Athol, Mass.*

Process Engineering

Grinding, mixing, classifying, processing, heat exchange equipment, hydrogenating, gas absorbing equipment, and other units, are illustrated and described in 36-page condensed catalog CEC-49.—*Patterson Foundry & Machine Co., East Liverpool, Ohio.*

Bakery Scales

The place of scales in the bakery is discussed in 20-page booklet. Photos of specialized equipment in action illustrate text.—*The Exact Weight Scale Co., 301 W. Fifth Ave., Columbus 12.*

Liquid Handling

Filters, filter sheets, vacuum bottle fillers, pumps, mixers and cappers in various styles are illustrated and described in 16-page bulletin.—*Ertel Engineering Corp., Kingston, N. Y.*

Bread Wrapping

Advantages of standard bread wrapper are detailed in 6-page foldout, which includes specifications and installation photos.—*American Machine & Foundry Co., 485 Fifth Ave., New York City 17.*

Pumps

Double suction, single-stage pumps are covered in Bulletin 955-N. And non-clogging raw sewage pumps are subject of Bulletin 964-E. Each contains much technical information, liberally illustrated.—*Buffalo Pumps, Inc., Buffalo 5, N. Y.*

Jet Condensers

Low-level, multi-jet condensers, reports 12-page Bulletin 5-A, give highest jet pump operating efficiency. Sizes, capacities, dimensions and weights, as well as properties of saturated steam, are included in tables.—*Schutte & Koerting Co., 12 and Thompson Sts., Philadelphia 22.*

Electric Pasteurizer

Heat is produced by electric resistance of milk in heater, thus pasteurizing product in 15 sec., reports 4-page folder. Equipment is available in six models for hourly production from 2,000 to 10,000 lb.—*Pure-Pak Div., Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32.*

Magnetic Separator

Separation of magnetic from non-magnetic materials is accomplished by variety of electric and non-electric magnetic pulleys, drums and other equipment covered in 8-page Catalog C-5000A.—*Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 14.*

Multi-Stage Turbines

A discussion of economics of byproduct power, diagrammatic sketches showing utilization of heat for typical plant operating conditions, data on flexibility of turbine drive, and consideration of basic types of turbines for different operating conditions, are among subjects of Catalog 4200.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Materials Handling

Materials-Handling Catalog

Casters, running gear for trucks, standardized load carriers, jacks, and many types of accessories and specialized units are included in 32-page Catalog 1201MH.—*Market Forge Co., Everett, Mass.*

Woven Wire Belts

Details of woven-wire construction of conveyor belts are covered in Bulletin 97. Lateral turn, open mesh and cleated booster belts are also depicted.—*The Cambridge Wire Cloth Co., Cambridge, Md.*

Bottle Caser

Rotary accumulating tables are eliminated when fully automatic casing apparatus is used, reports 6-page foldout. Other features of caser include three automatic stop devices, and capacity of up to 180 bottles per min.—*Bottlers Appliances, Inc., Salisbury, N. C.*

Fork-Lift Trucks

Bottling and vegetable canning plant applications of fork-lift trucks for moving, lifting and holding materials are detailed in Vol. 7, No. 2 of house organ, *Handling Materials Illustrated.*—*Towmotor Corp., 1226 E. 152 St., Cleveland 10.*

Roller Conveyors

Roller gravity conveyors and live roll conveyors are featured in 4-page illustrated Form 948. Booster, utility, slat, belt, overhead and vertical conveyors are among other types illustrated and described.—*Lamson Corp., Syracuse 1, N. Y.*

Hand and Beverage Trucks

Stair climber attachment is available for lightweight aluminum hand trucks and bever-

(Catalogs, Bulletins Continued)

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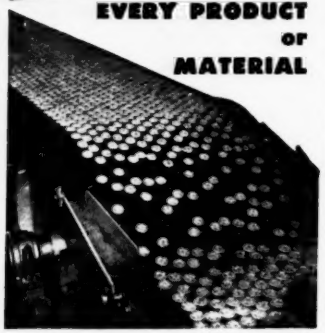

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age trucks discussed in 2-page bulletin. Hand truck, weighing less than 12 lb., will lift about 1,500 lb. of barrels or cases.—*Honeyman Mfg. Co., 1217 N. W. Everett St., Portland 9, Ore.*

All-Aluminum Conveyors

Prefabricated conveyors in aluminum and stainless steel are available in 5 and 10 ft. sections for low cost installation and maintenance, reports illustrated information sheet. Conveyors can be sterilized with hot water or steam.—*Mercury Conveyor, Inc., Broadway, Hillsdale, N. J.*

Tabletop Conveyor Chain

Photos of Table Top conveyor chains in use in breweries for moving bottles and cans are featured in house organ, *The Rex World*, Vol. 15, No. 1. Apparatus for wrapping oranges in Pliofilm is also described.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

Pneumatic Conveyors

Unloading, carrying and storing of dry powdered and granular materials, such as cereals, flour, coffee, malt and bran, with vacuum or pressure or both are described in 24-page Bulletin A-15. Photos of equipment in action and diagrams of installations illustrate text.—*The Fuller Co., 120 S. LaSalle St., Chicago.*

Chain Hoist

One-ton chain hoist is illustrated and described in Bulletin P-5. Details of construction, dimensions and prices are covered.—*The Harrington Co., 17th & Callowhill Sts., Philadelphia 30.*

Control Equipment

Combustibles Recorder

Electronic type instrument which can be applied to boiler furnaces, atmosphere producers, and chemical processes to measure combustibles is detailed in Bulletin 150-A. Either air- or electrically-operated control may be had with recorder.—*Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.*

Switchboards and Panelboards

Industrial enclosed switches, switchboards and panelboards, designed for compactness, flexibility, safety and beauty, are detailed in 4-page folder.—*Metropolitan Electric Mfg. Co., 22-50 Steinway St., Long Island City, N. Y.*

Air-Operated Motor Valves

Low-lift diaphragm valves for narrow-band proportional control are offered in Specification Sheet 401. Specifications and illustrations are included.—*Minneapolis-Honeywell Regulator Co., Belfield Valve Div., Philadelphia 44.*

Dairy Thermometers

Recording, dial, and industrial thermometers for dairy industry are detailed, with temperature ranges and physical dimensions, in Catalog 7000-C. Data on selection and use are included.—*Palmer Thermometers, Inc., 2529 Norwood Ave., Cincinnati 12.*

Plant Supplies

Pipe and Conduit Markers

Printed self-adhesive label strips for marking pipes and conduits of various sizes are featured in Bulletins 136 and 144. Samples will also be sent on request.—*W. H. Brady Co., Chippewa Falls 1, Wis.*

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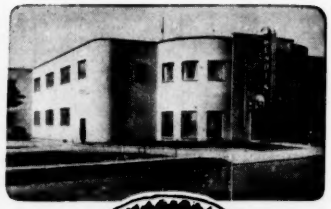

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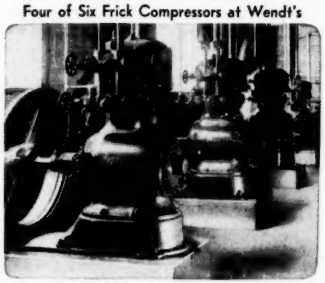

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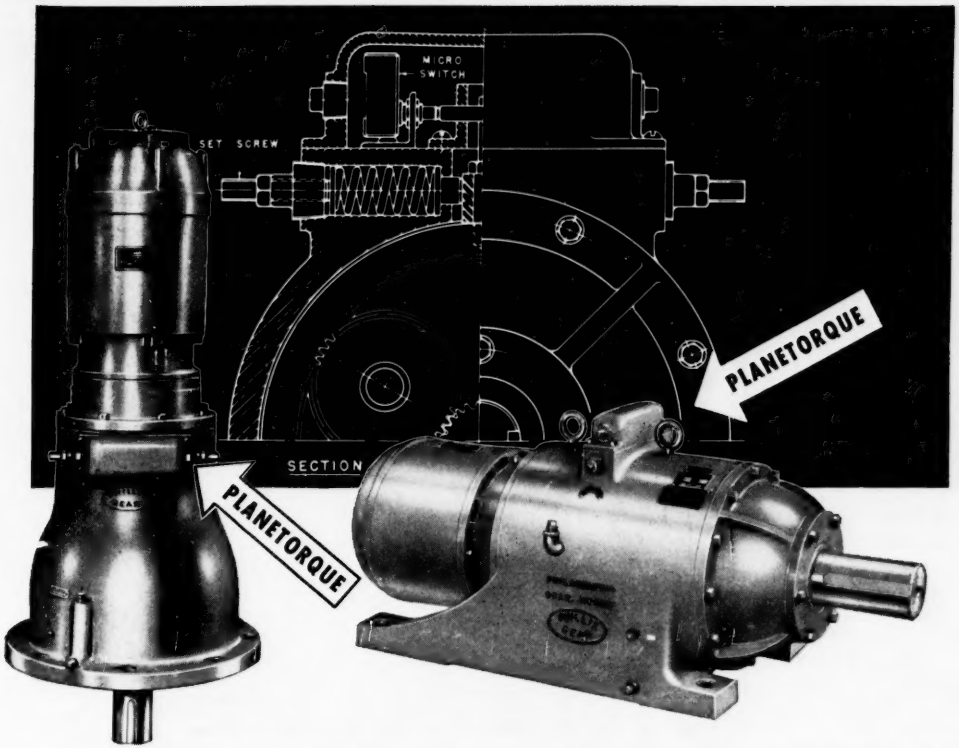

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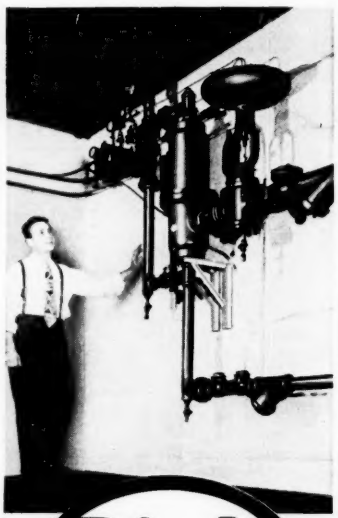

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Catalogs, Bulletins

system and eliminates expensive cleaning jobs by making sludge burnable with the oil, reports 6-page folder. Additive for emulsifying free water in fuel oil system is also described. —*E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, 33.*

Corrosion Service Piping

Stainless steel and nickel alloy anti-corrosion and anti-contamination piping is discussed in 32-page Bulletin 485. Economics of installation, standards, advantages of welding, design tips and dimensional information on stainless fittings and flanges are included.—*Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90.*

Refrigeration Equipment Maintenance

Air conditioning and refrigerating equipment can be economically cleaned by procedures and materials recommended in 20-page indexed booklet.—*Oakite Products, Inc., 22 Thames St., New York City 6.*

Parcel Post Scales

Time and postage savings are reported to result from use of direct reading parcel post scales detailed in 6-page foldout.—*Triner Scale & Mfg. Co., 2714 W. 21st St., Chicago 8.*

Meat Handling Truck

Chromium-nickel stainless steel meat handling truck is featured in Vol. 2, No. 10 of house organ, *Nickel Topics.* Cost is said to be lower on service life basis.—*International Nickel Co., Inc., 67 Wall St., New York City 5.*

Water-Soluble Spices

Solubilized essential oils which form clear colloidal suspensions promote flavor economy and efficiency, says house organ, *D & O News,* September-October 1949. Stability and flavor retention are other reported advantages. An article on coumarin is also featured, and price changes noted.—*Dodge & Olcott, Inc., 180 Varick St., New York City 14.*

Textile and Paper Bags

Cotton and paper bags, burlap bags and tubing, waterproof laminates, and other paper and textile specialties, are among products offered in 16-page booklet. Also considered are packaging machinery and company services.—*Bemis Bro. Bag Co., 408 Pine St., St. Louis 2.*

Industrial Floor Sweeper

Paths up to 40 in. wide can be swept with a time saving of 25-75 percent over push-broom methods by simple, rotating brush sweeper, reports 4-page bulletin. Specifications and illustrations are included.—*Handling Devices Co., Inc., 581 Boylston St., Boston 16.*

Miscellaneous

Corrosion-Resistant Materials

Plastic tubing and gasketing materials, protective coatings and linings, grinding and mixing equipment, chemical stoneware, pipe and fittings and laboratory equipment, all resistant to corrosive action, are illustrated and described in 8-page Bulletin M.—*U. S. Stoneware Co., Akron 9, Ohio.*

Cooling Towers

Operating and maintaining mechanical draft cooling towers is subject of 16-page brochure, which covers purpose, theory of

(Catalogs, Bulletins Continued)

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*Also available in 30 gallon size

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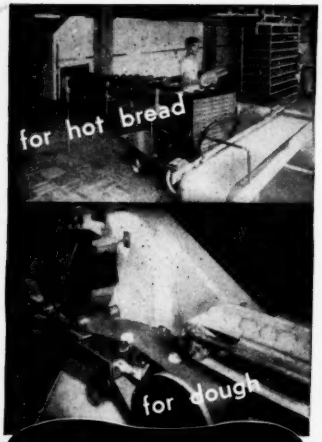

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Catalogs, Bulletins

operation, methods for checking, installation data, and economical use for maintenance engineers.—*C. H. Wheeler Mfg. Co., Lehigh & Sedgeley Aves., Philadelphia 32.*

Chemical Resistance of Neoprene

Article prepared as guide for engineers considering neoprene parts, such as hose, diaphragms and protective coatings in which chemical resistance is required, is featured in *Neoprene Notebook*, No. 43.—*E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Div., Wilmington, Del.*

Woven Wire Screen Cloth

Illustrations detail different weaves of screen cloth for various purposes in 16-page Bulletin 113-A. Text and tables cover selection of weaves and meshes.—*Robins Conveyors Div. of Hewitt-Robins, Inc., Passaic, N. J.*

Refrigerated Vacuum Centrifuge

Vacuum chamber, vacuum pump, refrigeration unit, electronic speed control, and other devices in 40,000 rpm. preparative centrifuge, are housed in one enclosure, reports 4-page illustrated folder. Construction details and prices are included.—*Specialized Instruments Corp., Belmont, Calif.*

Research and Development Facilities

Facilities for research in chemistry, physics, and engineering are pictured and discussed in text of 40-page brochure. They are open to utilization through sponsoring of special projects.—*Administration Div., The Franklin Institute Laboratories for Research & Development, Benjamin Franklin Parkway at 20 St., Philadelphia 3.*

Pipe and Accersories

Typical applications for lightweight, strong pipe are listed in Bulletin 493, which also shows sizes and wall thicknesses available and contains data on forge fittings and flanges.—*Taylor Forge and Pipe Works, P. O. Box 485, Chicago 90.*

Preventive Maintenance Control

Visible, complete maintenance and property records can be kept with use of office system covered in 6-page Folder KD-449.—*Systems & Methods Research Dept., Remington Rand, Inc., 315 Fourth Ave., New York City 10.*

New House Organ

Precision laboratory developments, technics to speed up routine testing, and other practical hints to laboratory workers, are featured in new bimonthly house organ, *Precisionomics.*—*Precision Scientific Co., 3737 Cortland St Chicago 47.*

Photoelectric Colorimeter

New type of filter colorimeter, said to be low in cost, offers precision of spectrophotometer, according to details offered in Bulletin B-214.—*E. Machlett & Son, 220 E. 23 St., New York City 10.*

Engineered Equipment

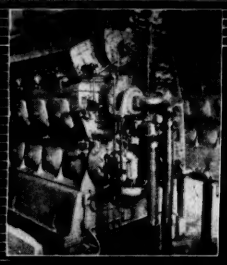
Services in designing process equipment in suitable alloys are presented in 8-page illustrated booklet.—*Brown-Hutchinson Iron Works, 1831 Clay at G.T.R.R., Detroit 11.*

Prefab Lab Furniture

Single units and typical assemblies of 18 standard pieces of laboratory furniture and accessories are offered in 20-page booklet.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

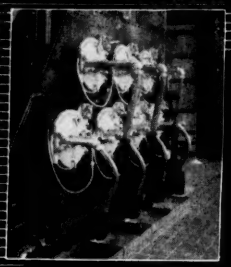
—End

GASES?

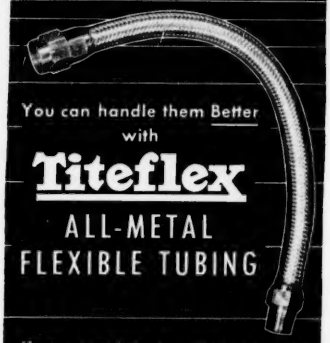


Exhaust lines on diesel engine

LIQUIDS?



Fuel lines in heating units



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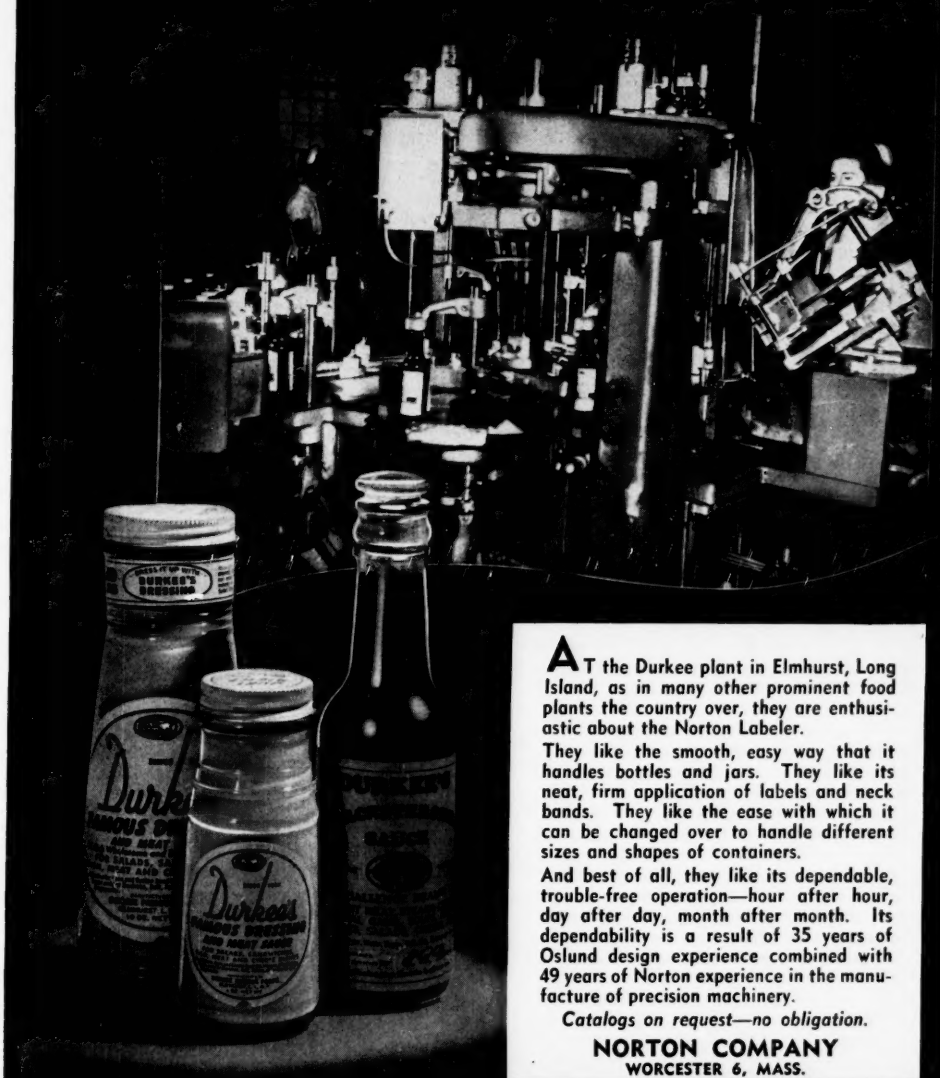

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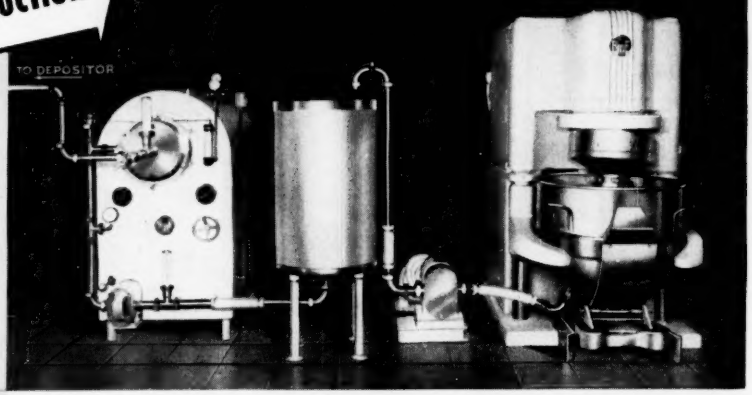

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Type of Cake	Running Time
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Rings	20′
Layers	30′
SPONGE BATCHES	
Jelly Roll	30′
Small Layer	11′
Large Layer	11′
Rings	30′
CHOCOLATE BATTERS	
Cup Cakes	30′
Layers	12′
Sandwiches	11′

With production capacity of up to 30,000 lbs. on varied production in an 8-hour day, the AMF Oakes Continuous Automatic Mixer proves its value on much smaller production.

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Patents

Amino Acids Synthesized—*N. F. Albertson, and S. Archer, to Winthrop-Stearns Inc., New York City.* No. 2,479,662. Aug. 23, 1949.

Poultry Dressed in Machines Fitted with Plucking Blades Operating in Opposed Relation to Each Other to Alternately Strip Light Feathers and Heavy Feathers and Quills—*H. F. Porter, Seaford, Del., one-half to Stephany Poultry Co.* No. 2,479,775. Aug. 23, 1949.

Bakery Dough Mechanically Sheeted and Rolled Into Loaf Form to Distribute Moisture Content—*H. C. Rhodes, to The Standard Stoker Co., Inc.* No. 2,479,864. Aug. 23, 1949.

Berries, Fruit and Like Mechanically Freed of Stems and Caps—*F. J. Paul, to Huntley Mfg. Co., Brocton, N. Y.* No. 2,479,961. Aug. 23, 1949.

Masses With Irregular Contours Such as Poultry Packed in Water-Tight, Thin-Walled Flexible Bags Containing Sufficient Water to Fill Cavities and Cover Surface Irregularities When Sealed Before Freezing—*R. D. Lowry and C. R. Irons, to Dow Chemical Co., Midland, Mich.* No. 2,480,082. Aug. 23, 1949.

Friable Food Materials Ground and Sifted in Ball Mill Designed for Continuous Operation—*G. J. Mitchell, to General Mills, Inc.* No. 2,480,085. Aug. 23, 1949.

Vitamin Food Product Consisting of Granular Absorbent Material Carrying Vitamins and Dry Layer Coating of Alkyl-Cellulose—*W. Fux, Vienna, Austria.* No. 2,480,103. Aug. 30, 1949.

Granular or Powdered Organic Material Containing Volatile Flavoring Substances Dehydrated in Closed Circuit by Circulating Drying Gas to Remove Moisture From Material, Removing Water From Gas, Cooling Dried Material, and Sending Dried Gas Through It to Return Volatiles Before Returning Gas to Closed Circuit—*R. Lee to Lee Foundation for Nutritional Research, Milwaukee.* No. 2,480,146. Aug. 30, 1949.

Mixture of Cashew Nut Shell Liquid and Cashew Kernel Oil Treated With Methyl Alcohol, Ethyl Alcohol or Isopropyl Alcohol to Selectively Separate the Cashew Kernel Oil—*S. Caplan, to The Harvel Corp.* No. 2,480,221. Aug. 30, 1949.

Mixed Glycerol Esters of Fatty and Hydroxy Acids—*L. L. Little, to E. F. Drew & Co., Inc., New York City.* No. 2,480,332, Aug. 30, 1949.

Fruit Pitted by Action of Tangential Rollers Equipped With Spaced Rows of Teeth to Rip Pulp From Seed of Fruit Passing Between Rollers—*C. E. Cole and E. J. Derderian to Elliott Mfg. Co. Fresno, Calif.* No. 2,480,357. Aug. 30, 1949.

Biscuit Dough Shaped in Rotary Molding Machine Equipped With Die Roll, Endless Web Conveyor Traveling Over Knife Edge, and Resilient Extraction Roll—*J. C. Paterson, Ovenden, Halifax, England.* No. 2,480,505. Aug. 30, 1949.

Cream Cooled by Passage Over Horizontal Cylinder Equipped to Supply Cooling Medium to Interior of Cylinder and to Discharge Cooled Cream into Trough Extending Along and at One Side of Rotating Cylinder—*A. Johnson to Land O'Lakes Creameries Inc., Minneapolis.* No. 2,480,583. Aug. 30, 1949.

Arginine, Histidine, and Lysine Recovered From Protein Hydrolysates—*E. E. Howe, and M. Tishler, to Merck & Co. Inc., Rahway, N. J.* No. 2,480,654. Aug. 30, 1949.

Corn in Husked-Ear State Popped by Energy of Electromagnetic Waves—*P. L. Spencer, to Raytheon Mfg. Co., Boston.* No. 2,480,679. Aug. 30, 1949.

Liquid Yeast and Vitamin Concentrate Obtained by Extraction of Vegetative Granules Coated With Vitamin-Rich Yeast Culture—*G. A. Jeffrys to Nelson Littell, New Canaan, Conn.* No. 2,480,738. Aug. 30, 1949.

Oil Recovered From Milkweed Seed Containing Not More Than 8 Percent Moisture—*C. F. Reed, to Federal Cartridge Corp., Minneapolis.* No. 2,480,769. Aug. 30, 1949.

Aldose Sugar Treated With Nitroparaffin in Presence of Alkaline Agent Under Substantially Anhydrous Conditions at Temperature Lower Than 40 C. to Recover C-Nitro-Alcohol—*J. C. Sowden and H. O. L. Fischer, Toronto, to Corn Products Refining Co., New York City.* No. 2,480,785. Aug. 30, 1949.

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(Patents Continued)

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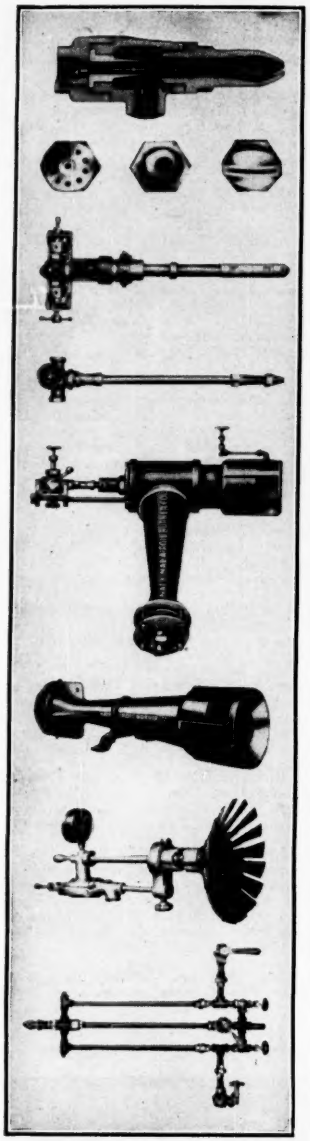

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Bonded to Its Surface—*N. W. Kempf, Auburndale, Mass. and H. H. Hoben, River Forest, Ill.* Fifty percent to General Foods Corp., New York City. No. 2,480,935. Sept. 6, 1949.

Foods Dehydrated by Sublimation in Alternating Electrostatic Field—*R. T. Palmer, to Westinghouse Electric Corp.* No. 2,480,954. Sept. 6, 1949.

Fruits Juiced by Action of Motor Operated Grater Plate on Vertical Axis—*W. E. Gundelfinger, to Knapp-Monarch Co., St. Louis.* No. 2,481,010. Sept. 6, 1949.

Mashed Potatoes Extruded as Filaments and Dehydrated by Circulating Air at Between 180 and 280 Deg. F.—*C. W. Kaufman, H. M. Burgess, and F. Hollis, Jr., to General Foods Corp., New York City.* No. 2,481,122. Sept. 6, 1949.

Large Cheeses Cut by Blade Operating in Vertical Plane and With Slidable Guard—*L. M. Seely, Cheltenham, Pa.* No. 2,481,162. Sept. 6, 1949.

Fruit Pits Cracked by Action of Spaced Corrugated Rollers—*R. T. Collier, to R. T. Collier Corp., Los Angeles.* No. 2,481,201. Sept. 6, 1949.

Cakes Iced in Machine Equipped With Means to Rotate Cake and Spread Icing—*G. Reget, St. Albans, N. Y.* No. 2,481,242. Sept. 6, 1949.

Cheese Ground in Portable Rotary Drum Grater—*J. Orlando, Brooklyn, N. Y.* No. 2,481,336. Sept. 6, 1949.

Liquid Milk Converted to Stable Fortified State by Absorption of Copper, Iron and/or Manganese Ions Dispersed in Assimilable Protective Colloid—*G. E. Grindrod, to Wisconsin Alumni Research Foundation, Madison.* Nos. 2,481,413 and 2,481,414. Sept. 6, 1949.

Concentrated Liquid Milk Made to Contain Ascorbic Acid and Fortified With Copper, Iron or Manganese Ions Dispersed in Water-Insoluble Caseinate—*G. E. Grindrod, to Wisconsin Alumni Research Foundation, Madison.* No. 2,481,415. Sept 6, 1949.

Milk, Fruit Juices and Like Dehydrated to Solid State by Single-Cycle Method of Spraying—*J. M. Hall, Chicago, to Drying and Concentrating Co.* No. 2,481,418. Sept. 6, 1949.

Eggs Mechanically Graded According to Weight—*C. Page to Page and Cox, Detroit.* No. 2,481,440. Sept. 6, 1949.

Roasted Coffee Subjected to Ethyl Alcohol and Water Extractions to Obtain Aromatic Extract—*H. Cohen, to Laboratories Medial S. A., Geneva, Switzerland.* No. 2,481,470. Sept. 6, 1949.

Poultry Killed, Dressed and Frozen in Successive Steps Without Precooling to Obtain Retention of Natural Flesh Texture and Flavor—*H. A. Noyes, Watertown, Mass.* No. 2,481,484. Sept. 13, 1949.

Sugar-cane Molasses Processed for Recovery of Aconitic Acid—*J. A. Ambler and E. J. Roberts, to U. S. A.* No. 2,481,557. Sept. 13, 1949.

Coffee and Other Granular Foodstuffs Compressed Into Compact Block for Packaging by Use of Oval Four-Walled Chuck Functioning as Compression Plates—*G. A. Moore, to Shellmar Products Corp., Mount Vernon, Ohio.* No. 2,481,611. Sept. 13, 1949.

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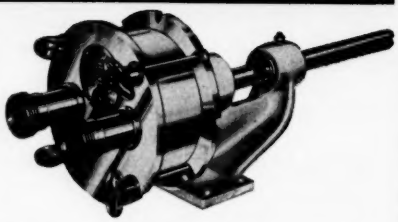

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Margarine and Similar Plastic Semi-Solids Continuously Molded Into Solid State by Extrusion to Form Ribbon of Predetermined Cross Section Preliminary to Intermittent Cutting Into Prints and Discharge From Extrusion Tube—*G. C. Schaub, to Best Foods, Inc., New York City. Nos. 2,481,689; 2,481,690; and 2,481,691. Sept. 13, 1949.*

Fruits and Vegetables Dried by Subjection to Light Wave Lengths Above 4900 Angstrom Units and Not Between 6300 to 6700 Angstrom Units—*M. R. Coe, to Rile-Coe Filter Process, Inc., The Weirs, N. H. No. 2,481,723. Sept. 13, 1949.*

Acid Reducing-Sugar Solution Deacidified and Purified by Organic Ion Exchange Treatment—*G. F. Mills to Chemical Process Co., San Francisco. No. 2,481,768. Sep. 13, 1949.*

Butter Made in Metallic Churns and Kneaders Having no Kneading Rollers—*F. J. J. J. Henrard, to Ecremeuses Melotte, Societe Anonyme, Remicourt, Belgium. No. 2,481,842. Sept. 13, 1949.*

Fruits and Vegetables Frozen by Action of Liquid Refrigerant Spray—*H. A. Noyes, Watertown, Mass. No. 2,482,202. Sept. 20, 1949.*

Doughs Made in Mixer Equipped With Rotating Rod Agitator Designed to Impart Kneading Action to Dough in Final Stages of Mixing—*T. F. Freed, to Standard Stoker Co. Inc., New York City. No. 2,482,256. Sept. 20, 1949.*

Rennet Paste for Cheese Making With Superior Keeping Qualities and Improved Flavor and Odor Made by Incorporating Hashed Rennet Stomachs, Liquid Rennet Extract or Powdered Rennet Extract in Whole Milk Curd in Ratios of 1 to 12 Parts to 60 to 100 Parts of Curd at 4 to 5 pH—*E. C. Scott and G. W. McDonald, to Swift & Co., Chicago. No. 2,482,520. Sept. 20, 1949.*

Bakery Products Iced and Glazed by Mechanical Means—*A. L. Spong, Denver. No. 2,482,563. Sept. 20, 1949.*

Improved Natural Casings for Sausages Made From Fresh Hog Intestines—*J. Gomeck, to Swift & Co., Chicago. No. 2,482,731. Sept. 20, 1949.*

Sugar Extracted From Fruit and Purified for Use as Sweetener—*A. M. Erickson and J. D. Ryan, to Barron-Gray Packing Co., San Jose, Calif. No. 2,482,750. Sept. 27, 1949.*

Solutions Containing Inorganic Ionized Calcium and Organic Solubles Subjected to Ion Exchange Treatment for Removal of Calcium Ions—*E. L. Haagensen, to the Dorr Co., New York City. No. 2,482,765. Sept. 27, 1949.*

Eggs for Breaking Mechanically Coated With Wax—*G. F. Hodson, to Wilson & Co., Inc. No. 2,482,774. Sept. 27, 1949.*

Soya Protein Dispersed in Ethylene Glycol or Diethylene Glycol and Peptized by Guanidine Carbonate for Use in Printing Inks—*A. F. Schmutzler, Teaneck, N. J. and D. F. Othmer, Coudersport, Pa. No. 2,482,879. Sept. 27, 1949.*

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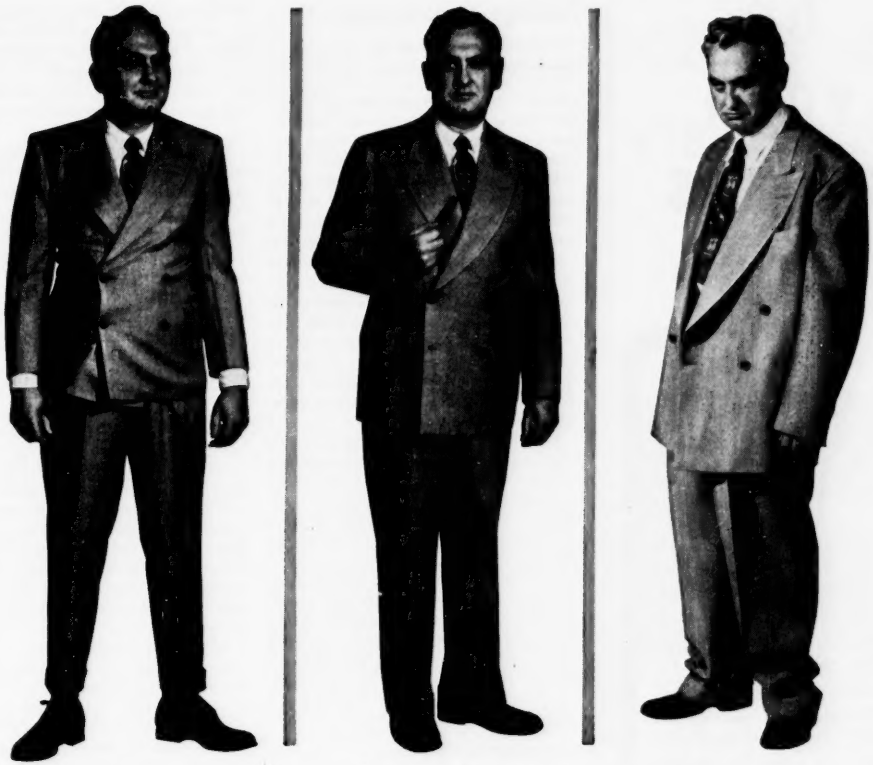
—*End*



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Package Redesigning

—Continued from page 45

return, it would be well for all sales, advertising and production departments to consider seriously if these unnecessary expenses are justified.

Have sales been stimulated sufficiently to warrant the added costs? How about protection of the products reaching the consumer? Yes, it should be of primary consideration, but has it been overdone? And is that window carton a sure thing for increasing sales? In some cases it has been. In others, not. Those windows add to production time, and there is the problem of their breakage, but likely they are sometimes necessary from a competitive standpoint.

On the basis of experience, we are convinced that in most cases it is the design—the appearance of the packages—that attracts new buyers and holds old ones. When this can be done at a saving, it becomes a double-edged sword of merchandising.

In redesigning one client's coffee can, a dollar per thousand cans was saved by simply eliminating one color. However, the important point is that the new, more effective design boosted sales, opened new outlets, and increased production, in turn further reducing the costs all along the line.

Coordinate Colors and Save

Another source of saving is better coordination of colors to allow for combination runs of packages for different products. This applies to companies with few items as well as those with many products.

Take a company with four or five products. It only employs three colors on a package, but it also uses one distinctly uncommon color on each. In practice, that means that in printing each different package, the expense of make-ready, wash up, and other work, is repeated. Where runs are relatively short, this individual cost certainly would be a factor. By design, and where cost is an influence, we can use the same three basic colors and yet make each package distinctive, so that the consuming public is not conscious of the same colors being used. This will allow for combination runs and greater volume, with only one basic manufacturing cost.

To go a step further, there are standard colors in reds, blues, yellows, and others. These hues are in constant use by all printers and package fabricators. A check will likely show that with these colors specified, the printer can divide his make-ready and wash-up costs among a number of clients who have individual short runs. Of course, to do this while still retaining individuality in the package calls for skill in design. Any check of packages in stores will show that most of them are red, white and blue, with the well-designed ones retaining their individuality.

In the case of the company with many products, we always remember the work done for a variety-minded client. To achieve diversity, he ran the gamut of colors throughout his line, necessitating printing each package individually.

After thorough investigation, we reduced all his packages to use either one or the other of two basic color combinations, each of three colors. By pure design, the previous objectives were maintained. Thus, by combination runs, the volume was increased on each run and prices were materially reduced.

After 17 years devoted exclusively to designing packages and studying the histories and results of hundreds of packages and packaging programs, we are sure that design plays a far more important part in sales and costs than is popularly recognized. Design attracts public interest and stimulates imagination.

We have been told about an enlightening test made in New England. An inferior canned product was dressed up with a new, attractively designed label—and proceeded to outsell the better-grade product made by the same company! This instance may seem extreme. Possibly it is. However, in this case there was ample proof that design had been responsible for the one outselling the other.

As stated earlier, increased sales mean increased production. And increased production means lower costs. Design has been one of the strongest factors in accomplishing this end.

—End—

Browning of Frozen Apples

—Continued from page 65

propriate treatments was analyzed for reduced ascorbic acid and SO_2 to determine their retention during storage.

Prefreezing treatments ranked in the following order for the general conclusion score: (1) Sodium bisulphite; (2) ascorbic acid, ascorbic acid-citric acid and potassium metabisulphite; (3) control, and (4) sodium chloride.

Munsell color notations indicated that the principal differences in hue were due to treatment. Value decreased slightly during storage. Chroma in all the frozen samples de-

clined steadily with storage, indicating loss of color.

Ascorbic acid and SO_2 were well retained in the fruit in 0 deg. F. storage.

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The above article was authorized for publication as Journal Article No. 1055 (N.S.), of the Michigan Agricultural Experiment Station, under the title "Methods for Preventing Browning in Frozen, Sliced, Jonathan Apples." Funds were provided by the Rackham Research Endowment.

—End—

Cut Pack Costs

—Continued from page 49

for by the planned operation. The varying pack quality and quantity of incoming material are automatically compensated by use of the appropriate grade standards. Similar control reports on ingredient usage and cost of supplies are made up.

The labor cost elements are segregated in the report on a control or variation basis. Those labor costs affected primarily by fluctuations in total plant volume are separated from those influenced by the volume of the various grades and those affected by the volume of the major types of finished goods containers. Within these major classifications, the labor cost elements are separated by functions so that adequate control can be maintained by responsibilities.

Preparing the daily plan consists of these steps:

1. Planned total volume and volume for each grade are developed from an analysis of incoming raw materials. By fitting these plans to over-all sales objectives, plant manager can determine a planned volume in each container type or size for the day.

2. From labor standards data, appropriate "Per-Unit Standards" are chosen. In some cases, these per-unit standards will vary with estimated grade volume or other conditions, but frequently they are constant figures.

3. Extending planned daily pack volumes (total, grade, and container) by appropriate standards will show Planned Operation man-hours for each cost responsibility.

Current Operations Control

In order to provide the best possible control over seasonal pack costs, a daily follow-up should be made on the projected plans, to show the following types of information: Labor performance at each important processing step, ingredient usage compared to standard, and materials and supplies usage compared to standard.

With proper report design, it is fairly easy to compare actual against planned performance. These control figures will give the plant manager the necessary current data to assist him in his supervisory job and to achieve low packing cost.

The form shown in Fig. 3 indicates how one control report was successfully combined with the daily planning report. Variations from plan usually occur in two ways: The planned volume (either total, grade or container) is not packed; or labor efficiency varies from standard. This form is designed to identify and isolate these two sources of variation.

When the day's pack results and actual man-hours by department have been reported, the control section of the report can be completed. The steps in completing this control section are as follows:

Actual production volumes of the total pack, for each grade, and for each container type or size, are entered in report.

Using same unit standards on which plan was developed, a standard man-hour allowance is developed for each cost responsibility. These man-hour data differ from those used for planning because of variations in volume between planned and actual. Difference between these standard man-hour figures and planned man-hours indicates labor cost variation resulting from not adhering to original daily plan.

Actual man-hour information for each cost responsibility are posted, and amount over or under standard recorded. This represents variation in departmental and plant labor cost due to labor or supervisory efficiency. It is figure department supervisor is most interested in and provides superintendent with his basic labor cost control data.

Although seasonal packing operations have usually been considered uncontrollable from a cost standpoint, it is not only possible but highly practicable to control these costs.

Much of the basic cost data required to establish control of the plant is of

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great value in over-all planning of the company's operations so that they will produce a profit.

The usual cannery cost system does not provide the necessary information for the plant superintendent to plan for essential low costs. However, labor, material and waste standards can be developed to show how the major processing departments should perform. Daily reports can be made to point out unprofitable operations before they are reflected in the usual cost or production reports covering an entire packing campaign. With this information available on a current basis, corrective action can be taken during the season.

—End—

Plant Men "Double"

—Continued from page 73

and housewives, and then left pamphlets and reprints of newspaper stories on Seabrook Farms which could be read later.

Into Philadelphia, New York (metropolitan and state), Connecticut, Washington, Baltimore, Reading, and other primary areas of Seabrook distribution, went these teams. In some cases, the distributors' route salesmen accompanied the men during the first few days of their stay, while in others they went in without benefit of introduction. In four months time—January 1 to May 1—they called on 7,904 retail stores and serviced 5,011 cabinets.

Later, when the greater bulk of the stores had been reached, the crews turned their attention to the development of new accounts. Their confidence primed by several weeks' contact with the retail grocery trade, they solicited 10,190 stores, came back with 1,241 new accounts.

Seabrook executives, looking over the reports from the field and checking them against increased sales figures, are crediting the project as being profitable beyond all expectations. Director of Marketing William M. Kline, in listing reasons for the venture's success, points out that the men proved the age-old sales maxim that to sell, one must know the product. "These men," said Kline, "were so well versed in production that they were natural salesmen once they had familiarized themselves with the selling routine."

Remarks of the distributors indicated that this was the most helpful kind of merchandising service from the grocer's viewpoint. Several mentioned that the grocers all appreciated the work done in cleaning the freezer box. But more than that—they appreciated the opportunity to talk to men qualified on frozen foods. Hundreds of letters attested to this reaction. From the distributor's own outlook, the project aided materially in solidifying contacts with their accounts.

Several of the men expressed the desire to continue with this assignment in preference to the jobs they held previously. As a result, these men are now forming a skeleton crew to work on sales promotion until the full group returns next January.

Still another "byproduct" came as a result of the enthusiastic sales talk the men gave the grocers. A large number expressed the desire to see the farms and plant during the summer, and more than 2,000 of them were taken on tours this past season, 40 to 50 at a time.

Starting modestly as a means of keeping the corps of processing specialists at work during a slack period, the "Man From Seabrook Farms" campaign snowballed into a promotion campaign that gave a relatively new label a tremendous boost at the level where it counted most.

Our same warehousing friend, Tom Seracino, had this to say at the end of the project:

"The biggest factor, I believe, in our opening new accounts was the fact that these men knew their product thoroughly, had faith in it, and were ready with all the answers about growing and processing.

"To my way of thinking, this is one of the most important phases of our business. We may set records in production and in shipping to distributors, but the ultimate goal is to get our products out of the grocers' cases and into the homes.

"We can go far in accomplishing this goal, particularly in these times, by a continued goodwill policy toward the grocer and by merchandising and selling ingenuity."

—End—

Lard Comeback

—Continued from page 56

Some of the newer lards now on the market are steam-rendered lards that have been further processed. The interest shown in the newer rendering technics, by meat packers in this country and abroad, foreshadows the appearance on the market of animal-fat shortenings or other animal-fat products not made by the older rendering methods.

Some of the large packers have been interested in the alkali-rendering process, which is available to the industry. The process is practical and efficient, and it produces a high-quality product adaptable to many types of shortenings and other edible oil products.

Lard producers are now realizing

that much of the ground that has been lost must be recovered to produce competitive top-quality products. The real merits of the alkali or other new rendering methods, compared to the older steam, open-kettle and vacuum-rendering processes, will not be determined until there have been several years of competition. Irrespective of what rendering method is used, it is imperative that rigid control be maintained over the rendering and subsequent processing steps to assure uniform high quality products which can command a suitable market.

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—End—

Takes Out Heavy Metals

—Continued from page 52

ring in vinegar, as insoluble phytates, a series of tests was carried out in which various solutions, containing different metals and combinations of metals at varying levels of trace amounts in 5 percent acetic acid, were reacted with calcium phytate dissolved in 5 percent acetic acid. The interactions of these solutions were both observed and analyzed. Results of one such series are outlined in Table VII.

Data obtained with both white distilled and cider vinegars and the 5 percent acetic acid solutions containing trace metals suggest other possibilities, in that vinegar containing 5 percent acetic acid can be regarded as a representative acid food or food material.

Likelihood of general application of the phytate method is encouraging. It has definitely been shown that calcium phytate may be utilized to remove metals, particularly iron, to a rather low level by a single application. More additions take out even the last few parts per million, leaving the solution under test relatively free from iron and other heavy metals. Other applications for this method of metal removal from acid foods and food material are under quantitative study.

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—End

STEPS IN CONTROL QUALITY

1—Provide optimum heat at process equipment.
2—Drain condensate free of entrained air to boiler without heat loss.
RESULT — Improved quality with substantial fuel savings.

Control of quality during processing is of unquestioned importance. Too often have high grade foods and fancy fruits and preserves been lowered in grade by a too-long cook. The chief problem in the past has been how to obtain faster cooking, how to maintain high temperatures at kettles and how to speed drainage of condensate without heat loss on return to the boilers.

Of the many steam developments in recent years, none has been so effective in overcoming these problems as the Cochrane C-B System. With this system maximum steam power is harnessed and put to work . . . wasted energy is recovered and utilized . . . fuel and power costs are lowered as equipment becomes more efficient, more productive, more profitable. To the food processor this means not only savings in fuel and greater production, but more important, a quality controlled product improved by better and faster processing—*foods that command Grade I prices.*

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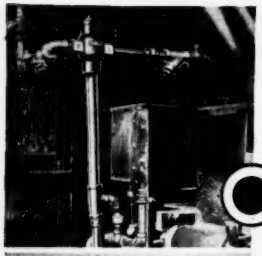
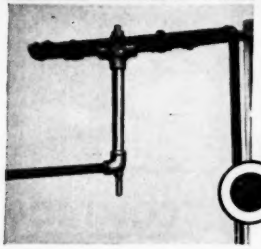


SAVING FLOUR



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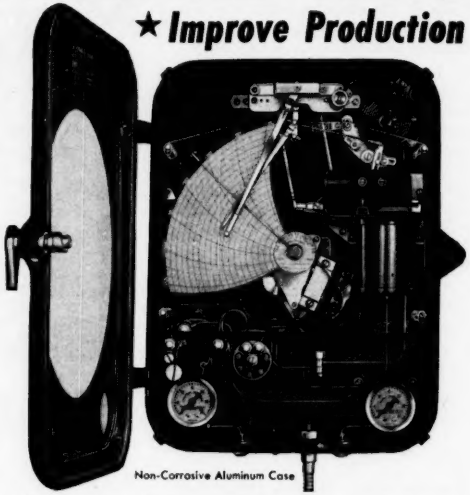

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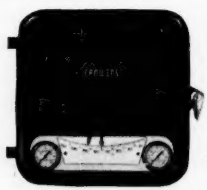

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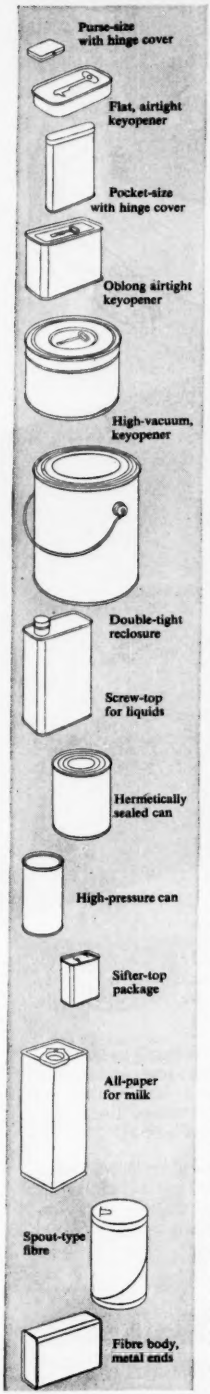

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Another important advantage is that Rex Double-Flex Chains can be laid out so that several different conveyor lines converge on one "main line" or delivery point. Combine two or more lines into one and you save time, space and money.

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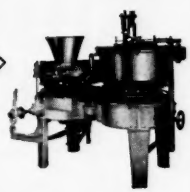

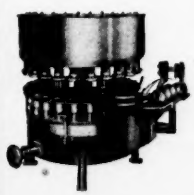

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A high-speed filler for Tomato Juice, Citrus Juices or any free-flowing liquid

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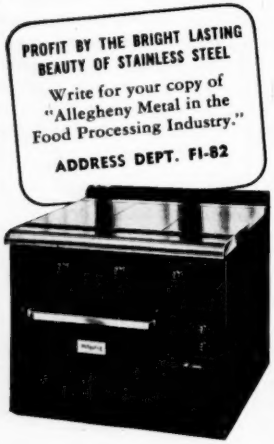
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He made this test!

562 families were each given samples of *two* batches of this manufacturer's beef stew, identical in every respect except for the addition of a small amount of Ac'cent in the processing of one. The cans were marked with code numbers, and the housewife was told to serve *both* at the same meal, on separate plates . . . then ask every member of her family, "Which do you prefer?"

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Ac'cent is not a flavoring, not a condiment. It adds no flavor, aroma or color of its own. It simply, but wonderfully, brings out—and *holds*—the *natural* flavors of foods. With Ac'cent, you use your own formulas; you prepare and cook as usual—just *add* Ac'cent.

Wire or phone for first-hand, accurate, full information. Let us discuss with you the possibility of Ac'cent in foods you pack.

Ac'cent is a 99+% pure monosodium glutamate derived from vegetable sources. It is a wholesome product of Nature. In 100 and 200 lb. drums.

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International Minerals & Chemical Corp.,
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Ac'cent® makes food flavors sing!

Trade Mark "Ac'cent" Reg. U.S. Pat. Off. Printed in U.S.A.

"The NEW PRODUCT and its PACKAGE must be developed TOGETHER"

Says
DR. LUCIUS W. ELDER
(Director, Products Evaluation Laboratory General Foods Corporation)

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The loaded steel band "floats" along on an open trough of circulating water. The water pressure is just enough to raise the belt off its supports. Surplus water overflows into gutters which collect and return it for recirculation.

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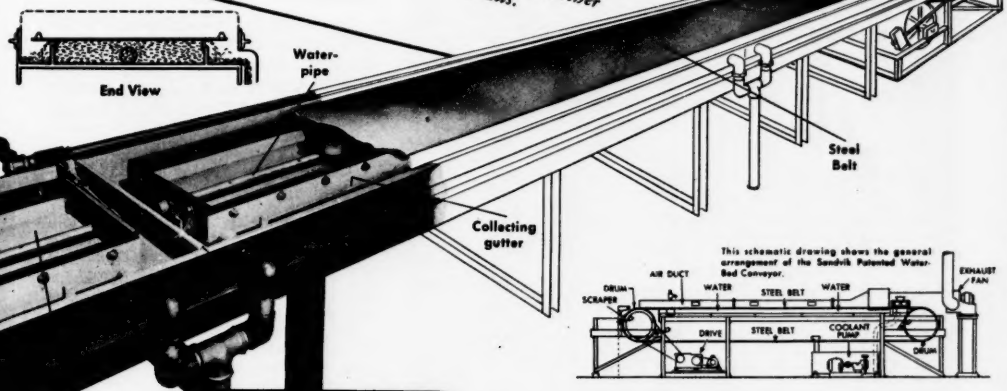
Tapered rubber strips fitted to the edges of the belt hold liquid material on the belt surface.

Sandvik can design and build a complete steel-belt conveyor, with or without the Patented Water-bed arrangement, to fit your specific needs. Write for further details.



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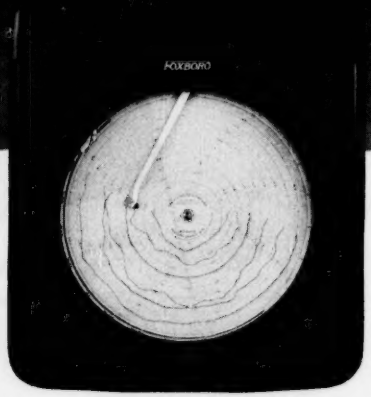

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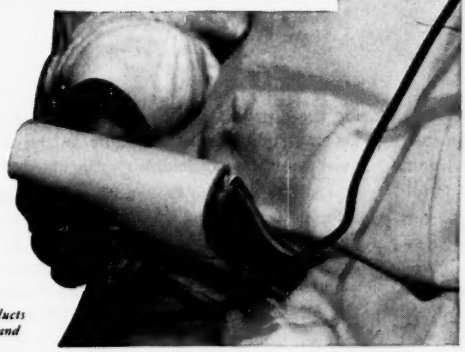

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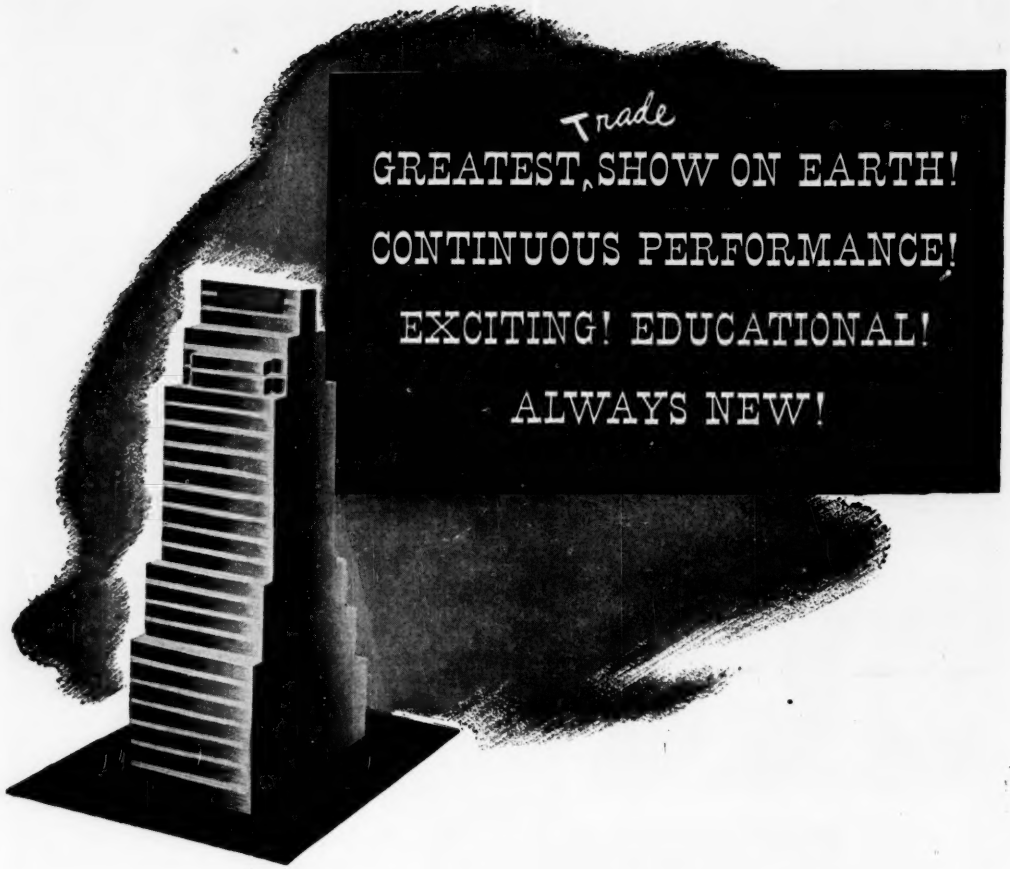

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**These surveys were supported by the Newfoundland Government, the Newfoundland Tuberculosis Association, the individual investigators, and Merck & Co., Inc.* (The Canadian Medical Association Journal, *March 1945 and April 1949.*)

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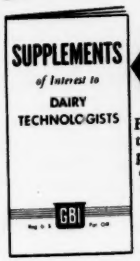

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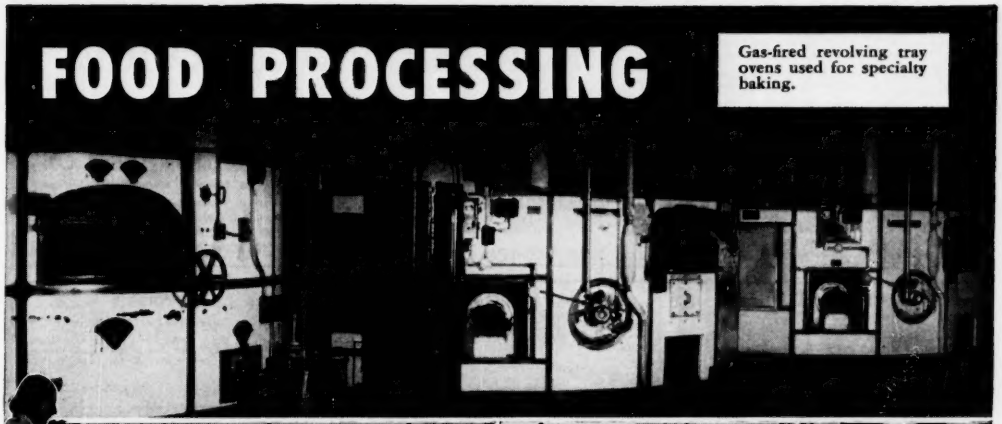
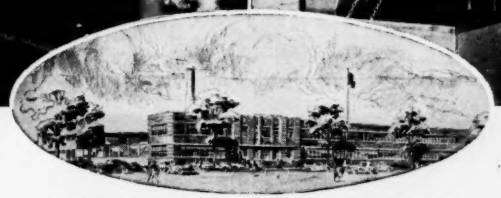
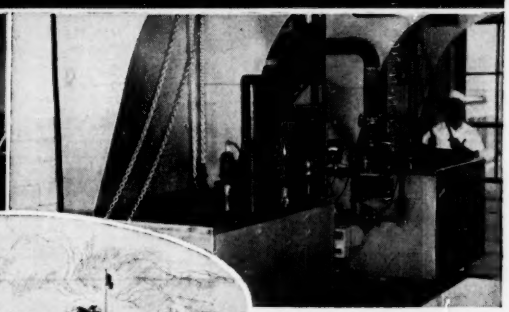


Gas-fired revolving tray ovens used for specialty baking.

Gas-fired cooker assures the absolutely uniform temperatures required for English muffins.





Immersion tank units used for blanching nuts are typical of the GAS units at work in this far-flung operation.

Exterior of Plant, 100 Oakman Blvd., Detroit 3, Mich.

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Versatile GAS performs a variety of operations for this Detroit food manufacturer—

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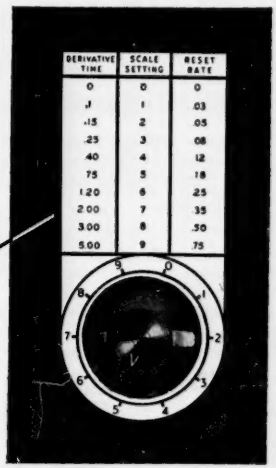

BRISTOL'S *Series 500 Air-Operated Controllers for temperature, pressure, flow, liquid level*

RESET, DERIVATIVE AND PROPORTIONAL TIME VALUES REPRODUCIBLE.

Adjustments are accurately calibrated and exactly reproducible. Similar settings in any Series 500 Controller will produce *exactly the same* values. This means you can replace controllers on a process with full assurance that such replacements will exactly duplicate the performance of the original. No more cut-and-try to arrive at the original setting . . . *saves hours by reducing shutdown time.*

These Features are NEW and EXCLUSIVE

SIMPLEST CONTROL SYSTEM TO SERVICE. Only one service adjustment is needed. The control units and parts making up the control system are so accurately designed and tolerances are so closely controlled that the system can be completely disassembled and reassembled, even with replacement parts, with only one simple adjustment needed to put the system in exact calibration. Almost anybody can service a Bristol Series 500 Controller.

FIVE TYPES OF CONTROL: on-and-off, proportional, proportional plus derivative, reset, reset plus derivative.

Investigate your new opportunity for accuracy and uniformity in automatic control. Write for new bulletin on Series 500 Air-Operated Controllers. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 91, Conn. (The Bristol Co. of Canada, Ltd., Toronto, Ont., Bristol's Instruments Co., Ltd., Lynch Lane, Weymouth, Dorset,

60 YEARS...1889-1949

BRISTOL

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

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BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices, count as one additional line.

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AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A. M. December 20th will appear in the January issue subject to limitations of space available

ASSISTANT PLANT PRODUCTION SUPERINTENDENT

NATIONAL ORGANIZATION

NORTHERN JERSEY LOCATION

Age 32-40. Engineering background essential in chemical and/or mechanical. Heavy production experience, preferably in food processing, packaging or related fields. Capable of handling administrative problems. Submit complete details first reply.

P-1389, Food Industries
330 West 42nd St., New York 18, N. Y.

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
h. Mold Counting and Insect Examination

RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS

Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-1301

FACTORY MANAGER

Well known, highly rated, medium-size food manufacturer in Middle West has need for an experienced factory manager. Will be responsible for entire production. Must have background as factory manager or assistant, in production of foods. Crackers, cookies and candy experience highly desirable. Ability to cut costs; maintain quality. Opportunity for progress. Salary commensurate with qualifications. Write in detail. Replies held in confidence.

P-1507, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

BROKERS WANTED

QUALITY CANNED FOODS

Owing to the devaluation of the pound we can confidently offer six lines of the highest quality canned foods which would be a popular and ready seller in the U. S. market. Will reputable brokers interested in handling these lines please communicate by air mail, with

MAURICE LEE UNGER LTD.

Garden Canneries
Boothstown, Manchester, England

Engineers - Executives - Technical Men

Salaried Positions, $4,000 to $30,000. This Confidential service for men who desire a new connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details.

TOMSETT ASSOCIATES
1203-2 Berger Bldg., Pittsburgh 19, Pa.

CHEMISTS

Juniors and Senior deg. men

Res. Dir.—Ph.D.—vitamins $15,000
Dairy Technologist—rec't deg. ..... Open
Tech'l Service—corn products $6,000
Call, write or wire:—Gladys Hunting (Consultant)

DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

When Answering
BOX NUMBERS...

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

REPLIES (Box. No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

BACTERIOLOGIST—With training and some experience in industrial microbiology to assist in planning and execution of research and field projects in the canning industry. Aptitude in analyzing and reporting experimental data essential. Eastern location. Salary open. Write P-1258, Food Industries.

SELLING OPPORTUNITY OFFERED

SALESMAN: EXPERIENCED with clientele for Chemical Cleansers and Floor Products in drums and barrels. Lifetime commission opportunity. Bram, 2107 W. Erie, Phila., Pa.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

SPECIALIST FOOD Products fish and meat. Particularly fish. Instructor control production. PW-1019, Food Industries.

QUALITY CONTROL Position—By plant scientist 32, grad study in horticulture with five years of practical experience in field and laboratory—including food lab., fruit processing and packing, and sanitation control. Good bacteriologist, fair chemist, interested in fruit and vegetable production and processing. PW-1432, Food Industries.

CHEMIST, RESEARCH and Production, with wide experience in many phases of manufacture and development of chocolate, confectionery, macaroni products, many desserts, and other food products, desires position of responsibility to fully use his ability. PW-1324, Food Industries.

FOOD CHEMIST: Experienced in bakers and confectioners supplies, inc. jellies, jams, syrups, extracts, tippings, and glaced fruits, maraschino cherries, frozen foods and specialty items. Complete knowledge of formulation and chemical analysis. PW-1397, Food Industries.

PLANT ENGINEER, University trained, electrical, mechanical, chemical engineer, with several years practical experience in plant engineering and construction, seeks position of more responsibility as ass't master-mechanic or plant engineer. PW-1361, Food Industries.

FOOD TECHNOLOGIST and Chemical Masters Degree. Experience in production, quality control, research, development. Excellent opportunity for food company seeking technical man. PW-1520, Food Industries.

SELLING OPPORTUNITY WANTED

EXECUTIVE OPERATING own office, nationally advertised line, has available time for additional lines or items. Will handle sales, sales promotions, advertising, outstanding items, specialties, food, etc. Regional or national coverage. Brokerage or salary basis. For particulars write Fred G. Orcutt, 209 W. Jefferson Ave., Naperville, Illinois, Phone 170-M.

(Continued on the opposite page)

FOR SALE
POULTRY DRESSING PLANT

Feeding Station — Zero Storage
Quick Freezer — Johnson Equipment
Good Location

Prospectus mailed on request

OPA-LOCKA BROILERS INC.
P. O. Box 835 — OPA-LOCKA, FLA.

CONSOLIDATED OFFERS

3—7500 gal. Steel Kettles, with copper coils, closed Agitated, 10' dia. x 12'6" deep, 15' overall height.
20—250 gal. Copper, jacketed Kettles, open top, with stands, 50" dia. x 42" deep.
1—2000 gal. Steel, Jacketed Kettle, open top, Agitated, 7" dia. x 7'6" deep.
1—Anco 3' x 6' Chilling Roll, M. D.
1—Louisville Steam Tube Dryer, 6' x 50'.
1—Rotary Vacuum Dryer, 5' x 33'.
1—#12 Sweetland Filter, 4" centers, iron or copper leaves.
3—Pkge. Machinery Type F9 Cellophane or Wax Wrapping Machines.
8—Day Powder Mixers, up to 2,000#.
2—Stokes & Smith Powder Fillers, M. D.
2—World Rotary Automatic Labelers.
1—York 6" x 6" Refrig. Unit, 20 HP Motor.
1—Buffalo 32 x 90" Atmos. Double Drum Dryer, 20 HP AC Motor, s/s hood.
8—Baker Perkins Size 15 Mixers, jacketed, 100 gal. working capacity.
1—8 x 12' Oliver Acid Proof Filter.
1—W & P, Size 16 Mixer, unjacketed, 150 gal. working capacity.

ONLY A PARTIAL LIST

THE KEY TO SAVING TIME AND MONEY
CONSOLIDATED PRODUCTS COMPANY, INC.
13-17 Park Row New York 7, N. Y.

(Continued from opposite page)

SELLING OPPORTUNITY WANTED

PACIFIC NORTHWEST Representation. Obtain personal, technically qualified representation and sell your chemicals, apparatus, machinery, basic materials this rapidly expanding agricultural industrial-marine market. RA-1622, Food Industries.

BUSINESS OPPORTUNITY

Miami, Fla.
Modern creamery processing whipped cream. No competition. We supply dairies, supermarkets, restaurants and soda fountains. $30,000, Terms. Wonder Whip Inc., 1530 NW. 7th Ave., Miami, Fla.

FOR SALE

1 New, never used, Iron Fireman 24PS Pneumatic spreader stoker with all controls.
1 New Mojonnier tubular heat exchanger—Model 96-5. Stainless steel jacket—capacity 22,000 lb. skim/hr. 45°-178° F. 96-15/16 I.D. tubes—5 ft. long. Includes panel board, instruments, valves, etc.
1 Model V-40 Ste-Vac heater—stainless steel —40,000 lb./hr.-40°-160° F. Complete with pump, relief valve, gauges, etc.
1 Union Steam Pump viscolizer—450 g.p.h. —stainless steel sanitary head—enclosed frame—with 20 HP. motor.
1 6 ft. Rogers copper vacuum pan—4000 lb./hr. and Byers barometric condenser—two 750-gal. hotwells.

WYETH INCORPORATED
R. O. Phillips — Mason, Michigan

WANTED

Large engineering firm wishes to acquire several complete food plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible; strictest confidence.

Box 1219, 1474 Broadway, N. Y. 18, N. Y.

FOR SALE
1 TRIANGLE ELECTRIC-PAK FILTER
Model N-1
Very good condition
CHAS. A. GERBER CO.
Bartlett, Illinois.

UNUSED BATCH MIXERS AT HALF NEW COST

75# cap., steel construction, manual or power unloading.

GLASS LINED TANKS LIKE NEW

USED ONLY ONCE

3200 gals., insulated, agitated. Built to pass Board of Health regulations.

DUST COLLECTOR

Dracco Automatic Filter Unit 3300 to 3900 CFM complete. Contact parts S.S.

HEAT & POWER CO., INC.
70 Pine St. DIgby 8-0373 New York 5

For Sale

One Pitney-Bowes Model DU Code Dating machine can be used for code dating food products. Further information pertaining to the above can be secured by writing B. J. Rotert,

THE KROGER CO.,
1212 State Ave. — Cincinnati 4, Ohio

MACHINERY FOR SALE

1—Marco Flow-Master Kom-bi-nator Model K-500
1—Marco Flow-Master Kom-bi-nators (homogenizers) Model KAC-500
In excellent condition, used for experimental purposes only. Suitable for wet refining or homogenizing.

FS-1393, Food Industries
330 W. 42nd St., New York 18, N. Y.

FOR SALE AT REDUCED PRICE EVAPORATOR—IN NEW CONDITION

Double effect Mojonnier Tubular Evaporator. Continuous operation for producing Condensed Milk—Ice Cream Mix. Never used in manufacturing. Also suitable for condensing other liquids.

Write HERSHEY CREAMERY CO.
Box 121 — Harrisburg, Pennsylvania

For Sale TWO DICERS

1—Dippel Diana Model #7 used hydraulic dicer for meats, vegetables, fruits; in good condition $750.00
1—Diana Model #9, practically new hydr. dicer for above products, perfect condition..... $1100.00
These machines yield perfect cubes ¾" or 1" size, and parts available for other size cubes. Output 1800 lbs./hour. Complete with motor, ready for use.

Allen Products Co., Allentown, Pa.

VOTATOR

1—#41015—3 cylinder 4 inch direct expansion Votator complete with 15 H.P. motor Waukesha Feed Pump. Float control ammonia accumulator and other necessary controls. Machine is original crate. Price upon request.

FS-1410, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

FOR SALE

Cherry-Burrell 6 wide soaker type bottle washer 5 years old. In good condition. Will sacrifice for quick sale. Available immediately. Replacing with larger washer.

MEADOW BROOK DAIRY
Buffalo Road at Harrison
ERIE, PENNA.

WANTED

One #100 Food Machinery Company or other type Pulper or Finisher.

CHEMICAL MACHINERY & CONSTRUCTION CO.
19 East 80th Street New York, N. Y.

WANTED

Used single effect vertical evaporator, capacity 2,000 to 3,000 lbs. per hour at 120°F maximum evaporating temperature, tubes 1½" minimum heating surface 450-750 sq. ft., all contact parts of stainless steel, preferably type 316.

WALLERSTEIN COMPANY, INC.
180 Madison Avenue .. New York 16, N. Y.

WHERE TO STORE FROZEN FOODS

WANTED
a Mikro-Pulverizer or a Comminuting Machine

Advise price and condition when replying to W-1451, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

If there is anything you want

or something you don't want that readers can supply—or use—*advertise it in the*

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QUAKER CITY COLD STORAGE CO.

PHILADELPHIA, PA
3 WAREHOUSES
Proper Temperature for Frozen Foods

FMC

The Sign of Good Equipment "Buys"

- 2 Rietz S.S. Disintegrators with 30 HP and 50 HP motors
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- 2 Horizontal Retorts 18' long
- FMC No. 50 Super Pulper—7½ HP
- Kettles & Tanks in S.S. or Copper
- Vacuum Pans, Cookers, Evaporators
- Heat Exchangers—Pasteurizers
- Dryers—Dehydrators—all types
- Pulpers, Finishers, Extractors
- Colloid Mills, Homogenizers
- Filters, Filter Presses
- Choppers, Dicers, Crushers
- Slicers, Grinders, Pulverizers
- Labelers, Fillers, Cappers

FMC specializes in Complete Plants: Brewery, Distillery, Winery, Juices, Meat Packing, Vegetable Canning, Peanut Butter, Salad Dressing, etc.

Send Us Your Inquiries

FIRST MACHINERY CORP.
157 Hudson Street,
New York 13, N. Y.

SPECIALS

4—Stainless Steel 6' x 30' Bubble Cap Columns, Type 347 S.S., 21 plates.
3—Closed 3450 Gal. Stainless Steel Tanks & Coils, Type 347 S.S.
2—Stainless Steel Spray Towers, 33" x 17'.
3—Bartlett & Snow 96" dia. S.S. Kettles with Agitators.
1—New Glasscote 1,000 Gal. Jacketed Agitated Glass Lined Reactor.
1—New Pfaudler Glass Lined Jack. Reactor, 500 gals.
1—Code Welded Type 316 Stainless Steel Jack. Reactor, 1,000 gals., with Agitator and Exp. Pf. Motor.
1—Stainless Steel 2,500 Gal. Vertical Tank with Agitator.
4—Vertical 8,000 Gal. Stainless Steel Storage Tanks.
10—Horiz. Dry Powder Mixers 15# to 2500#.
2—Mikro Pulverizers Model 2TH, 10 H.P. 3 Phase Motors.
1—Sperry 42" Wood Plate & Frame Filter Press, Hyd. Closure 57 ch., 1¾" cake.

We Buy Your Surplus
Send for Bulletin A-24

The Machinery and Equipment Corp.
533 West Broadway
New York 12, N. Y. GRamercy 5-6680

FOR SALE

CASE EMULSIFIER —HOMOGENIZER

For mixtures, dispersions, emulsions, and homogenization. Stainless Steel. Production 300-360 gallons per hour of perfect Emulsion-Homogenization. Employing one operator. Used 6 months. On wheels—no installation necessary. Priced at $1,500.

FS-1454, Food Industries
330 West 42nd Street, New York 18, N. Y.

FOR SALE
100 qt. Read Vertical Mixer
80 qt. Hobart and Triumph Mixers
Enterprise Grinder with 8¾" plates
Burns Peanut Roasters, Cooling Truck, Blowers and Blanchers
Buffalo Chiele Chopper
SAVAGE BROS. CO.
2638 Gladys Ave., Chicago 12, Ill.

The EQUIPMENT CLEARING HOUSE, Inc.

A new FOOD EQUIPMENT outfit who will quote you BETTER machinery at LOWER PRICES . . . faster and more informatively because our staff is experienced, well-trained and eager to get NEW CUSTOMERS

Try our service . . . you will be amazed at the DIFFERENCE . . . whether you want to buy or sell you can get a BETTER DEAL at ECH

289-10th St. Brooklyn 15, N. Y.
Phones: SO uth 8-4451 - 9264 - 8782

EQUIPMENT FOR FOOD AND PROCESS INDUSTRIES

1—#5 Mikro Atomizer, Stainless Steel, w/20 HP Motor.
1—#2TH Mikro Pulverizer, w/15 HP Motor.
1—Sperry Stainless Steel Filter Press, 24" x 24", 12 chambers.
1—Sperry Stainless Steel Filter Press, 12" x 12", 15 chambers.
1—Patterson nickel lined Blender, 192 cu. ft. cap. w/20 HP Motor.
2—Alloy Fabricator, Stainless Steel jacketed vacuum Reactors with agitators and motors 180 gal.
2—Buflovac Vacuum Drum Dryers, 24" x 20".
1—Sparkler Filter 18-D-8.

R. GELB & SONS, INC.
UNION, N. J.
Est. 1886 UNionville 2-4900

Quick ANSWERS to your business problems . . .

HUNDREDS of miscellaneous business problems can be quickly and easily solved through the use of the Searchlight Section of this or other McGraw-Hill publications.

When you want additional employees or a position, want to buy or sell used or surplus equipment, want products to manufacture, seek new capital or have other business wants — advertise them in the Searchlight Section for quick, profitable results!

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330 West 42nd Street
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FOR SALE
24"x20" Buflovak Vacuum Drum Dryer.
32"x52" and 36"x120" Double Drum Dryers.
100 to 300 gal. S.S. Mix Tanks, water jkt.
200 and 400 gal. S.S. Tanks, insul., agit.
150 gal. Votator (Rapid Heat Exchanger).
40 & 100 gal. S.S. Clad, also Alum. Kettles, jkt.
Ft. Wayne Sterilizer, (agit.) 4'x6'6".
100 to 330 gal. Pfaudler Tanks, water jkt., agit.
2000 and 3000 gal. Pfaudler Tanks, agit.
125 to 1000 gal. Homogenizers or Viscolizers.
10" Bronze Filter, 14 plates with Pump.
3' to 6' S.S., also Copper Vacuum Pans.
"Lightnin" Portable Mixers, 1/3 & 1/4 H.P.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
Waukesha Sanitary Pumps, ¾ & 3 H.P.
Mayno S.S Pump, ½ H.P.

Send us your inquiries
LESTER KEHOE MACHINERY CORP.
1 East 42nd Street, New York 17, N. Y.
Murray Hill 2-4616

WE CAN FURNISH AT ANY POINT NEW AND USED TIGHT AND SLACK BARRELS AND STEEL DRUMS, PAILS AND KITS. LET US HAVE YOUR INQUIRIES.
BUCKEYE COOPERAGE CO.
1810 Orange Ave., EXpress 3383, Cleveland 15, O

CELOSEALS FOR SALE
Large quantity of 30mm x 15mm transparent DuPont celoseals. Condition: Guaranteed. Listing of surplus food, bottling and process equipment also available.
CONTINENTAL DISTILLING CORP.
F. Lehman, 1429 Walnut St., Phila. 2, Pa.

Late Type Processing Equipment

UNION Rebuilt Machinery Established 1912

NOW AVAILABLE AT BARGAIN PRICES

Stokes and Smith G4 and Automatic Duplex Auger Powder Fillers, cap-pressing attachments.

National Packaging JK Two Station Automatic Auger Powder Filler, with cap-pressing attachment.

Burt Automatic Wraparound Labeler.

Colton and F. J. Stokes Late Style Rotary and Model T Tablet Machines.

Triangle Package Models U1 Auger, G2C and A60A Electri-Pak Fillers.

Triangle SHA Auto. Net Weigher, High Speed Adj. Semi-Auto. Carton Sealer.

Standard Knapp No. 429 Carton Sealer, 10 and 18 ft. Compression Units.

Package Machinery Co. FA2Q Wrappers Hayssen 3-7 and Scandia SSU1 Automatic Cellophane Wrappers.

Mikro 4TH, 2TH & 1-SH, Jay Bee 3AT and U1, Schutz-O'Neill, Stedman Mills.

Baker Perkins JNM and Readco Heavy Duty 100-150 gal. Double Arm Jacketed Mixers with Sigma or Fish-tail Blades.

J. H. Day 8-gallon Pony Mixer.

F. J. Stokes, J. H. Day, New Era, Hottman Mixers, from 2 gallons up to 450 gallons, with and without Jackets, Single and Double Arm Agitators.

Day and Robinson 100, 600, 1000, 2400, 4000 lbs. Dry Powder Mixers and Sifters.

Schutz-O'Neil #3 Sifters; Gayco 8' Air Separator.

Pony M & MX Duplex Labelrites, Ermold and World Semi & Fully Automatic Rotary & Straightaway Labelers.

Horix Stainless Steel Rotary Filler, Elgin 24 Head Rotary Filler.

International New Unused Auto. Straightline Vacuum Filler.

Ertel 12 Head S.A. Vacuum Filler.

Sweetland, Vallez, Sperry, Shriver, Johnson and Republic Filter Presses.

Pneumatic Scale Auto. Tite-Wrapper.

Ceco Auto. Carton Closing Machine.

Filler 1, 4 and 8-head Stainless Steel Automatic Piston Fillers, Rising Bed feature and automatic Feed.

Huhn, Steam & Gas-fired Rotary Dryers.

A. O. Smith and Hersey 6' x 23' Rotary Steam Tubular Dryers.

Amsco Rotary Bag Heat Sealer.

Enterprise, late model, 6K, 6-inch motor driven Fruit and Meat Grinder.

ALL EQUIPMENT GUARANTEED TO BE IN GOOD WORKING CONDITION.

Write, Phone, Wire Collect for Details and Prices on your Requirements.

Union STANDARD EQUIPMENT CO.
318-322 LAFAYETTE ST., NEW YORK 12, N.Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

BUY BRILL

8—Ross 2-truck Steam Tray Dryers, 500 sq. ft. drying surface, with trucks.
2—Elmco 4'x8', 1½'x1' Stainless Steel Rotary Vacuum Filters.
1—Shriver 18" Aluminum P&F Filter Press.
2—#2 Sweetland Filters, Stainless Steel.
1—#10 Sweetland Filter, 54 leaves.
1—Bird 18"x28" Monel Continuous Centrifuge, motor driven.
1—Tolhurst 40" Suspended Centrifugal, with monel perforated basket, m.d.
5—Rotex Sifters, 40"x50", 40"x84", 40"x120".
25—Stainless Steel Kettles and Tanks, 50 to 500 gal., new and used.
3—Knapp, Burt Automatic Can Labelers.
3—Mikro Pulverizers #1SH and #2TH.
12—Day, Robinson Powder Mixers, 100 to 4000 lbs; also jacketed.
2—Stokes & Smith Model G-1 Fillers.

SEND FOR COMPLETE STOCK LIST

Get Our Quotations and Compare

BRILL EQUIPMENT COMPANY
2401 Third Avenue, N. Y. 51, N. Y.
Telephone Cypress 2-5703

FOR SALE

Filler: Pneumatic 18 spout, stain. steel.
Meat Mixers: Boss #3 and #15.
Dryers: 2- 6x40' Davenport hot air rotary.
Mixers: 80 qt. 3 and 4-speed Hobart Vertical.
Mixer: 120 qt. Glen Power Plus, var. speed.
Mixers: Powder: 20-20 Burton, 1000# Robinson.
Kettles: Stain. Steel, all sizes, (New).
Fillers: for liquid, powder, paste.
Fillers: Stokes & Smith single and double.
Filter Presses: 7", 12", 24", cast iron.
Filler: Filler Machine Co. 6 spout—stain. steel.
Capper: Resina—practically new.
Vacuum Pan: 6' copper, coils and jacket.
Labelers: for bottles, jars, cans.
Filler: M&S, Universal 6-pocket.
Carton Gluer: Ferguson with comp. unit.
Centrifugal: Tolhurst 40" suspended steel.

Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
1931 W. North Ave. Chicago 22, Ill.

FOR SALE

2—Retorts, Horiz., 33" W x 28" H x 15'6" L
1—Retort, Horiz., 33" W x 29" H x 16' long
2—Retorts, Horiz., 36" dia. x 72" long; 33" dia. x 72" long
1—Spray Pasteurizer, 150 gal. Stainless Steel
1—Aluminum Autoclave, 100 gal., jktd. & Agit.
1—Aluminum Still W/coils—175 gal.
1—Aluminum Reaction Kettle, closed, with jkt., coils and agit., 1000 gal.
2—Aluminum Jktd. Kettles, open-top—20 gal. & 40 gal.
15—Stainless Clad Jktd. Kettles, 60 gal. & 80 gal.
8—Stainless Steel Jktd. Kettles—50 gal. to 500 gal.

PACKAGING & BOTTLING MACHINERY AUTOMATIC & SEMI-AUTOMATIC

Large stock of Fillers for liquids, powders and pastes; Cappers and Cap Tighteners; Wrap Around and spot labelers for bottles and cans; Bottle Rinsers and Air Cleaners; Case Gluers and Stitchers, Belt Conveyors and Conveyor work tables; Gravity Conveyors. Complete automatic and semi-automatic lines.

6—Tri-Clover Stainless Sanitary Centrifugal Pumps, model 2EJ, 2EBH, 2½EH—UNUSED
3—Stainless Steel Tanks, open top, 30 gal.
6—Stainless Steel Tanks, open top, 150 gal.
3—Stainless Steel Tanks, 3450 gal, vertical, bolted top with coils.
24—Mammut lined horiz. welded steel tanks, 7' dia. x 11' long—3200 gal. cap.
33—Pfaudler horiz. bolted steel tanks with brewery glass lining, 7500 gal. and 8250 gal. cap.

PERRY EQUIPMENT CORP.
1511 W. THOMPSON ST. • PHILA 21 PA

FOR SALE—MODERN PACKAGING EQUIPMENT

PNEUMATIC SCALE CO. 35 Per Minute. AUTOMATIC CARTONING LINE Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit

PNEUMATIC SCALE CO. Tightwraps
PNEUMATIC SCALE CO. Wax Inner Liner
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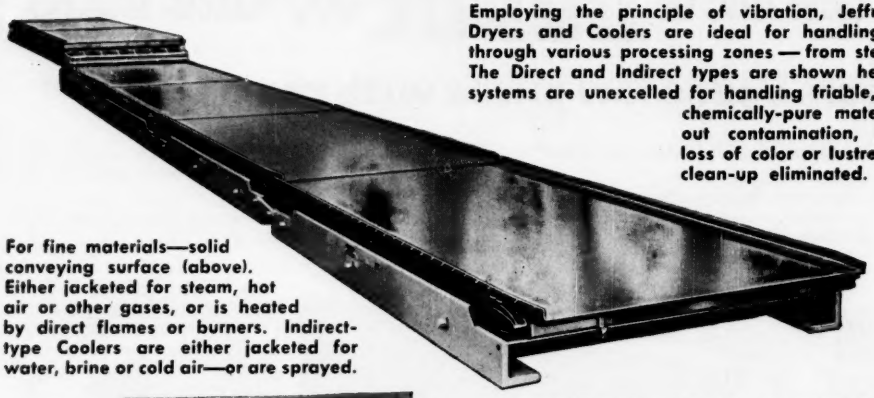

For fine materials—solid conveying surface (above). Either jacketed for steam, hot air or other gases, or is heated by direct flames or burners. Indirect-type Coolers are either jacketed for water, brine or cold air—or are sprayed.

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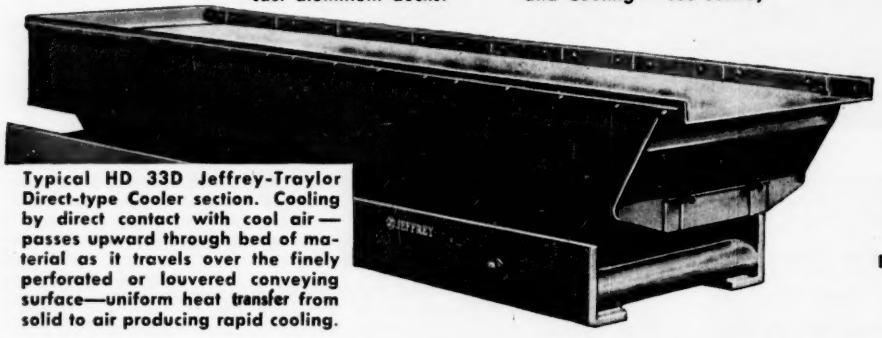

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